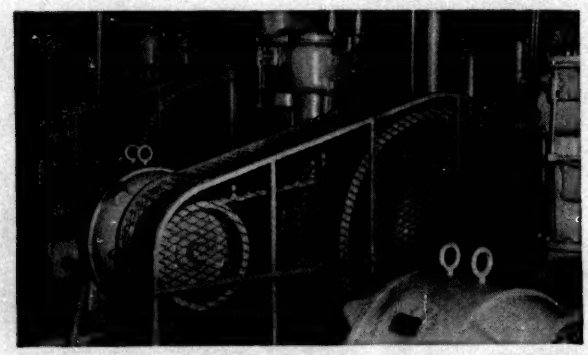
INDUSTRIAL REFRIGERATION

World's largest tuna clipper spends 70 days at sea—with a perishable cargo . . .

The Western King, world's largest tuna clipper, may be at sea for 70 days at a time, with as much as 600 tons of highly perishable tuna aboard. If refrigeration falters, the catch is lost. That's why the Western King relies on *Texaco Capella Oil Waxfree* to keep refrigeration compressors running smoothly, at top efficiency.



Lubrication with *Texaco Capella Oil Waxfree* keeps these York 7½ x 7½ ammonia ice machines running more smoothly, longer, and at greater efficiency.

Texaco Capella Oil Waxfree won't wax out in the system—even at temperatures as low as minus 100°F. It resists oxidation, remains stable throughout its extra long service life. And it's available in 55 and 5 gallon drums, 1 gallon cans, and the more popular grades in 1 quart containers.

Let a Texaco Lubrication Engineer help you select the proper ones. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

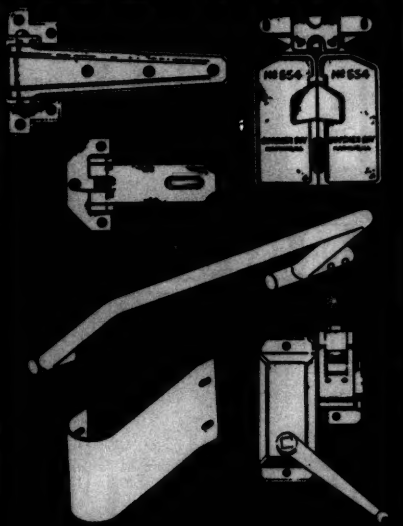
The Texas Company, 135 East 42nd Street, New York 17, New York.

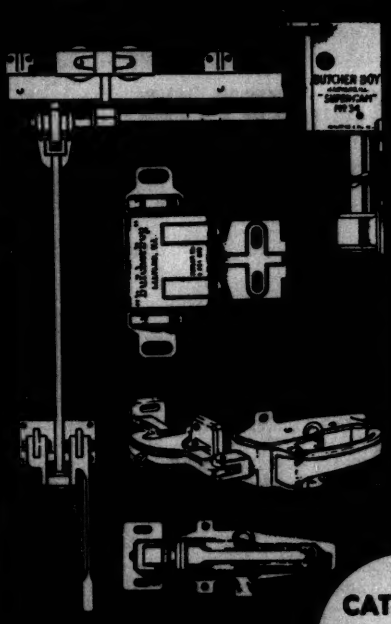
LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

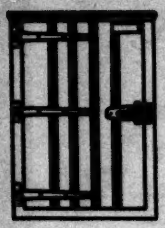
"Butcher Boy"
Since 1892

REFRIGERATOR DOOR
HARDWARE



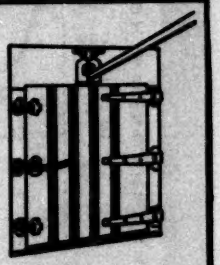


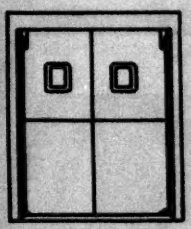
SAFETY RELEASE FASTENERS



STANDARD
COOLER-FREEZER DOORS

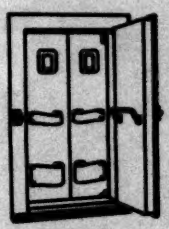
- Modern Streamlined Appearance
- 100% Douglas Fir Construction
- Massive and Durable Hardware





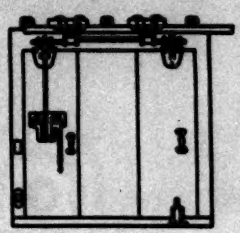
STANDARD VESTIBULE
AND AUTO CLOSE DOORS

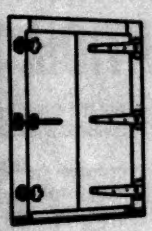
- Double Acting Doors for Loading Docks
- For Heavy Trucking Openings
- Save Refrigeration Losses



HORIZONTAL SLIDING DOORS

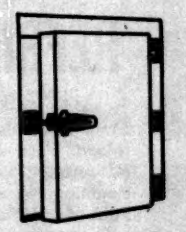
- Ideal where space factor is limited
- Recommended for Freezer Areas
- Available for manual, air, or electric operation
- Mechanically operated doors open and close in less than 4 seconds





LOW TEMPERATURE
INFITTING AND SUPER
FREEZER OVERLAP DOORS

- Low Temperature Doors for +10 to —20° F
- Super Freezer Doors for —0 to —100° F
- Both types available with No. 51 electric defrosters
- Extra heavy duty hardware applications



New!

FULLY AUTOMATIC
ELECTRIC DEFROSTERS

- Underwriter's Approved—An exclusive First with Butcher Boy
- Flexible "silicon" covered (not lead covered) heater cables
- Furnished with calibrated "thermostat"—economical heat control

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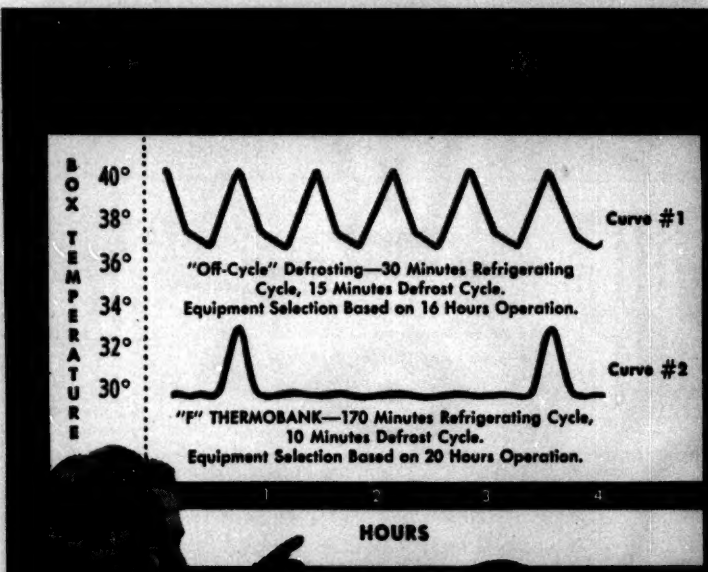
AVAILABLE
UPON
REQUEST



FRESH FOOD INDUSTRY ACCLAIMS NEW KRAMER "F" THERMOBANK

KRAMER UNFOLDS A NEW CONCEPT OF REFRIGERATION APPLICATION FOR FRESH FOOD

To obtain the fullest advantage in the storage of most fresh food, a constant temperature of 30° or 32° must be maintained. Since every defrost cycle results in fluctuations in temperature and humidity, to maintain the best storage conditions the number of defrost periods and the length of each defrost must be reduced to an absolute minimum.

The new "F" THERMOBANK has the *fewest* possible defrost periods and is the only system that will go into a defrost when it is really needed and not before; this is most essential to prevent unnecessary defrost which results in wide temperature and humidity fluctuations in the storage room. (See Curves)

The "F" THERMOBANK is completely defrosted in the shortest possible duration (10 minutes). No other defrost system, regardless of type, can approach this fast defrost, but the rapidity of defrost is indispensable to hold the ideal conditions of 30° or 32°.

Because the "F" THERMOBANK guarantees the fewest and most rapid defrosts, equipment is selected for 20 hours operation. This permits the selection of a smaller compressor and a smaller THERMOBANK system resulting in lower first cost as well as economical operation. When the added benefits of "F" THERMOBANK features such as less waste, longer shelf-life, less dehydration, less mold and bacterial infection, and maintenance of "freshness" during storage, are included in the cost estimate, the "F" THERMOBANK is incomparable in value.

Selection and application of the "F" THERMOBANK are simple. Rapid selection tables covering a wide range of cooler sizes for 30° applications are available.

WRITE FOR BULLETIN TV-380

KRAMER TRENTON CO. • Trenton 5, N.J.

43 YEARS OF CONTINUOUS ACHIEVEMENT IN HEAT TRANSFER

Industrial Refrigeration

September, 1957

Now in its 66th Year of Publication

Number 3

Vol. 133

J. F. NICKERSON, Founder

INDUSTRIAL REFRIGERATION, Vol. 133. No. 3. Published monthly at 433 N. Waller Ave., Chicago, Ill., U.S.A., by Nickerson & Collins Co. Yearly subscription in the U.S., $2.00 per year; other countries, $3.00. Single copies, 25 cents. Copyright 1957 by Nickerson & Collins Co. Acceptance as controlled circulation publication at Chicago, Ill., and Pontiac, Ill.

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Contents

Automatic Equipment Speeds Handling in New Combined Milk and Ice Cream Plant 13
Air Conditioning Exposition Promises Many Innovations 16
New Australian Storage Provides Modern Facilities For Storing Fruits 17
Industrial Air Conditioning a Booming Market 19
Associated Grocers Complete Million Dollar Warehouse 20
Ice Plant Operator Adds Distribution of Cylinder Gas Equipment 24
Heat Pump and Solar Energy—Their Roles in Space Conditioning 25
Cultivating the Foreign Market for Poultry Products 31
National Asscication Practical Refrigerating Engineers 32
From the President's Desk 32
Reduce Power Fuel and Water Costs 34
NAPRE Question Box 38
Chicago Moves Ahead with 48th Meeting Preparations 42
News Notes and Chapter Activities 43

Departments

What's New in Equipment .. 5
Press Briefs 8
In the Spotlight 11
Coming Conventions 51
News of People 52
Deaths 53
Manufacturers News 54
Catalogs and Bulletins 55

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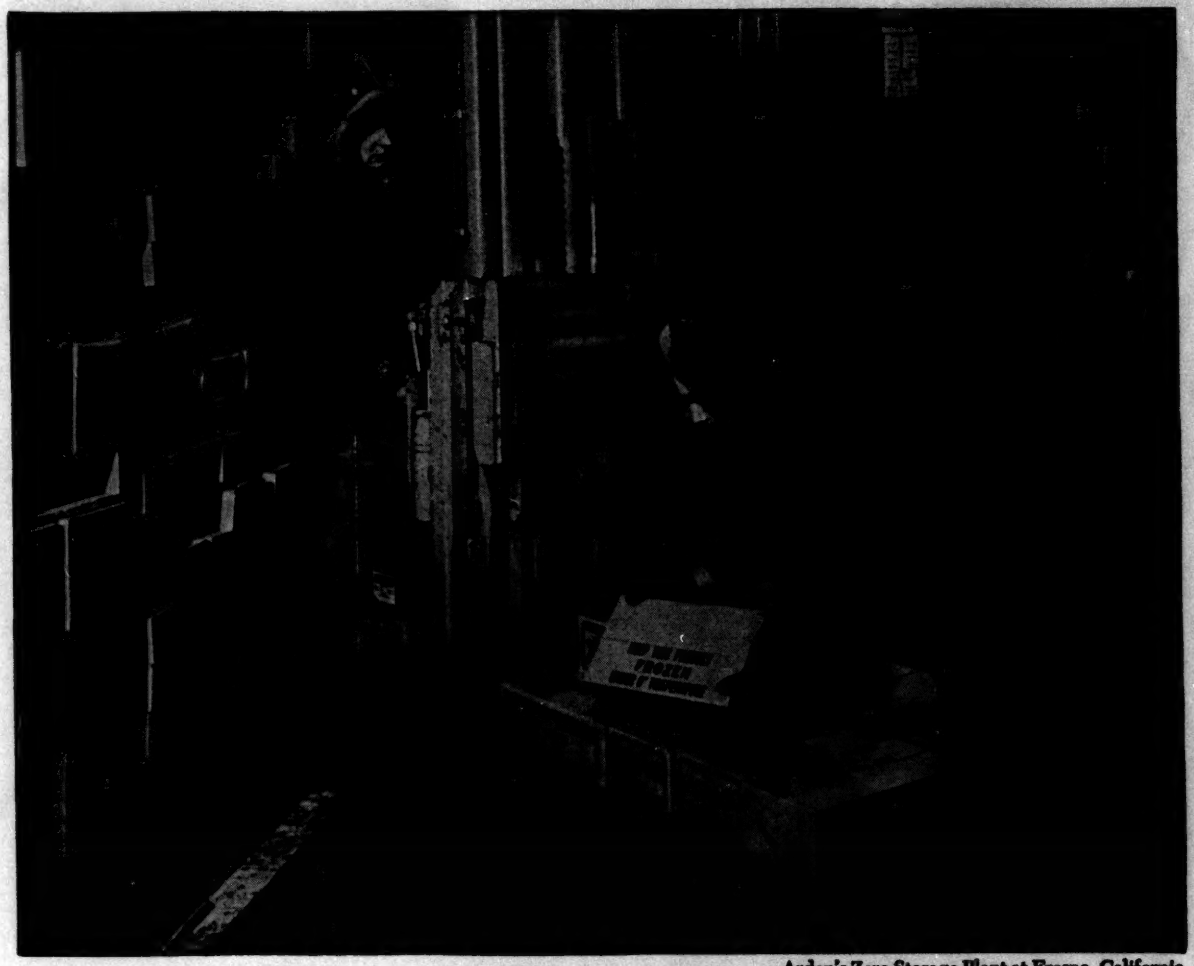
The Cover:

Shown here is the new Carnation Seattle plant's ice cream processing room. In foreground under the refrigerant suction lines is a glimpse of the completely automatic Vitafreze unit which has a capacity of 1200 dozen novelties per hour. In center of the picture can be seen the seven continuous ice cream freezers. To the right of the freezers are seen portable conveyors which carry finished products to the sharp room.

Behind the freezers are seven, 1500-gal stainless steel storage tanks for ice cream mix and raw ingredients. They are equipped with cold wall surface and air operated valves. Against the right wall are located mix pasteurizers, homogenizer and cooler. Above can be seen windows of the hostess room, from which visitors may view the entire operation. See article starting on page 13.



Arden's Zero Storage Plant at Fresno, California

No ice formation in Styrofoam® insulation in seven years of use by Arden Farms

Styrofoam, a Dow plastic foam, was first installed by Arden Farms in its Portland, Oregon, ice cream plant in 1950. Since then, Styrofoam has been used in other ice cream plants and a cold storage plant.

"We feel we can use Styrofoam without fear of the insulation becoming ice laden over a period of time," says C. H. Stevenson, Chief Engineer at Arden. "The material eliminates a great deal of expense in framing the ceiling of our cold storage rooms in that it is very light weight and will not build up with ice. Styrofoam has good insulating qualities and will retain them throughout the entire period of use."

For specific information about Styrofoam and its many outstanding advantages, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Department PL1702C.

CHECK THIS EXCLUSIVE COMBINATION OF PROPERTIES

Insulations	Low "K" factor	Superior water resistance	High compressive strength	Light weight	Superior resistance to rot and vermin	Easy handling and fabrication	Low-cost installation	Lowest cost per year service
STYROFOAM	●	●	●	●	●	●	●	●
A		●	●		●			
B	●			●			●	
C	●		●					

YOU CAN DEPEND ON DOW

WHICH STYROFOAM DISTRIBUTOR IS NEAREST YOU?

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Los Angeles 13: Pacific Foam Products Co.
San Francisco: Western Foam Products, Inc.

FLORIDA

Tampa: The Soule Co.

GEORGIA

Atlanta 8: Badham Sales Co.

ILLINOIS

Chicago 11: The Putnam Organization, Inc.

IOWA

Des Moines: Wilson-Rogers, Inc.

KANSAS

Kansas City: Styro Products, Inc.

MASSACHUSETTS

Ipswich: Atlantic Foam Products Co.

MICHIGAN

Detroit: Par-Foam, Inc.
Midland: Floral Foam Products

MINNESOTA

Minneapolis 8: Edward Sales Corp.

MONTANA

Billings: Madden Construction Supply Co.

NEW YORK

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OHIO

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THE DOW CHEMICAL COMPANY
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What's New

MACHINERY
APPLIANCES • PROCESSES

Unitized Freeze Dryer Introduced by Stokes

VACUUM freeze dryers which are self contained have just been introduced by the Vacuum Equipment Division of F. J. Stokes Corp. Philadelphia. They combine for the first time the efficiency of larger industrial units with the flexibility of small laboratory-scale models. The new Stokes unit shown, Model 2003F2, is therefore suitable for research and development work as well as moderate-scale production.

Freeze-drying—the process of drying a substance by sublimation of its water content to vapor directly from a solid state without passing through the liquid phase—is very useful for the preservation of extremely sensitive biological and other substances. They retain their original characteristics over long periods of time during which these properties would otherwise be impared or lost. Freeze drying retains all the potency and sterility of these substances, and there is minimum loss of volatile constituents. No oxidation or damage to the cell structure occurs, and the substance reconstitutes readily to its original state.

Product to be dried may be first prefrozen on the two lower plates or shelves, which are chilled to minus 40 F by direct expansion of "Freon-22". It is then transferred to the two upper shelves where it is dried under high vacuum by sublimation. Two drying shelves provide a total drying area of four square feet. Lower refrigerated plates serve as the condenser plates during the drying cycle, and have a condensing capacity of up to five liters of water per batch.

The Model 2003F2 pictured is a completely self-contained unit, having its own electrically heated hot water system, thermostatically controlled, for positive forced-feed circulation through the drying shelves. This system, as well as the "Freon" compressor and other accessories, is housed in the cabinet below the vacuum chamber. A high-capacity mechanical vacuum pump is mounted behind the vacuum chamber. The "package" includes all controls and instruments, including a Stokes high vacuum gauge.

The unit measures 63" high and occupies floor space of 24" left to right by 35" front to back. The vacuum pump, mounted behind the unit, measures 22½ inches high by 17 inches wide by 31-3/4 inches deep.

New Stokes Model 2003F2 vacuum freeze dryer.

Improved Freon Valves

NOW available are Wolf-Linde Freon Seal Cap Valves with screw ends, flanges, and flanged brass connectors. They are offered in both globe and angle designs. Manufacturer, Dersch, Gesswein & Neuert, Inc., state that these valves feature extra heavy stems, back seating, full size ports and passageways. The smaller sizes have threaded bonnets—the larger have bolted bonnets. All valves and fittings are carefully tested to assure leakproof performance.

New Freon Seal Cap Valve

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THE MAGIC GREEN PELLETS

for

- **FASTER ICE**
- **CLEARER ICE**
- **STRONGER ICE**

TEMPLETS are a positive, modern means to better ice. Scientifically formulated, they dependably temper raw water ice . . . improve its character . . . virtually eliminate checking, cracking, shattering . . . and give you an ice that's clear, clean, and invitingly attractive . . . with white butts and cores reduced to the barest minimum. And . . . you'll get faster, stronger ice with TEMPLETS at less cost. See for yourself. Test a quantity. Order a FREE SAMPLE today.

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Please send me a free sample and literature on TEMPLETS.

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Company.....

Address.....

City.....State.....

Refrigeration Device Unloads Chlorine

AN unsual dual use of refrigeration in industry is this application at the Hydrite Chemical Co., Milwaukee, Wisconsin. Use of a Heat-X package chiller and liquid cooler reduces from 24 hours to 7½ hours the time required to unload a tank car of chlorine. Separate circuit use of the Package Chiller also protects tanks of commercial caustic bleach from breakup.

As shown, chlorine is piped directly from incoming tank cars through the liquid cooler (inset) at the station where the

Heat-X package chiller and liquid cooler unloads tank car of chlorine at Hydrite Chemical Co.

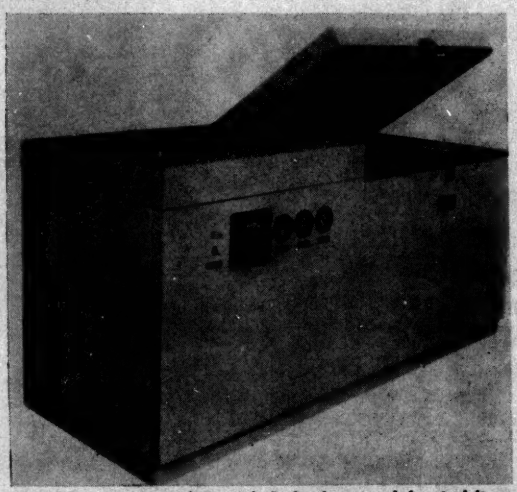
cylinders are filled. This liquid cooler has as the chilling medium Glycol at 15 F furnished from a remotely located Heat-X Package Chiller. Construction of the chiller guards against any possibility of damage from freeze-up.

Glycol cooled to 15 F in the package chiller is also piped (through a separate circuit) to the tank where commercial caustic bleach is prepared. Heat exchangers on a separate caustic bleach circulating system keep the bleach cool, preventing the breakdown of Sodium Hypochlorite, the desired end-product.

Patented Inner-Fin Construction of the 7-ton capacity Heat-X chiller, which provides more cooling surface in less area, permits a much less bulky unit than would otherwise be required to obtain the chilling capacity to supply both circuits.

Service-Rated Frigid-Cabs

A NEW line of Service-Rated Frigid-Cabs designed for 24-hour continuous duty are now available from Labline, Inc., Chicago, Ill. Service-Rated Frigid-Cabs are made in 3, 6 and



New Service Rated Frigid Cab designed by Labline, Inc.

9 cubic foot sizes and temperatures from minus 40 F to minus 120 F. They are suitbale for many uses such as, testing of materials, testing of equipment, steel stabilization, storage and lifetime testing, processing and storing of pharmaceuticals, hardening and shrink-fitting, rivet cooling and aging, blood bank storage, processing of biologicals, testing of electrical components, etc.

The interiors are made of 18-8 stainless steel with all seams welded and may be used wet or dry. Insulation is vapor sealed and consists of a minimum of six inches of Fiberglas and cork throughout. Formica breakers isolate inner cold chamber from outer cabinet wall. Refrigeration systems consist of over-size compressors and components mounted on special vibration eliminating supports. All refrigeration connections are brazed and tested with electronic leak detectors. Hinged covers are insulated and spring counter-balanced for easy opening and closing.

Service-Rated Frigid-Cabs can be supplied with Thermopane observation window in cover, circulating fan, explosion-proof electrical controls, terminal boards or any modifications required for specific needs.

Henry Valve Driers in Wall Display

A COMPLETE new line of patented Abso-Dry Pressure Sealed Driers and Filter-Driers is announced by the Henry Valve Company, Melrose Park, Ill. In connection with their introduction, all Henry wholesalers have been furnished with an attractive counter or wall display showing the driers in relief and full color.

The new Henry Valve Wall display

Speaking enthusiastically of the new driers, Evan Jones, chief engineer of the company, said, "We believe that the Henry Abso-Dry Pressure Sealed Driers represent an advanced step in drier design. To obtain maximum drying efficiency, Henry now thoroughly reactivates each drier and, by an exclusive, patented process of manufacture, provides positive indication, by pressure sealing, that the drier is tight, dry and factory-fresh on reaching the user. When the end connection seal of a new Henry drier is loosened prior to installation, there is a hissing sound due to the escape of dehydrated air," said Mr. Jones.

Need thermometers? ...ASK TAYLOR

IF you do you can't do better than call your Taylor Field Engineer. He is a specialist in temperature measurement. And Taylor makes a wide variety of thermometers for just about every possible application in the refrigeration industry. If you prefer, write for **Catalog 300.** Taylor Instrument Companies, Rochester, N.Y., or Toronto, Canada.

THERMOGUIDE* Dial Thermometer
An extremely reliable and sturdy vapor-actuated instrument for Brine Lines, Brine Tanks, Ammonia Lines, Cold Storage Rooms, Refrigerators, etc. Variety of standard ranges from minus 40° to + 120°F. Four forms of bulb and connection. Case diameter 6½".
No. 14KV123, $47

Metal Wall Thermometer
Easily read, even in dimly lighted areas. Non-fading red liquid in magnifying tube and black figures and graduations on white background. Flanged edges give tube maximum protection. Range minus 40° to + 70°F., in 1° divisions. Length 12".
No. 1106, $3.30

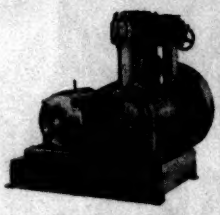
Taylor Industrial Thermometer
Exclusive BINOC* tubing, makes it three times easier to read. For Cold Water, Brine, Ammonia, Condenser, Hot Water and Steam Lines, Brine Tanks, Cold Storage Rooms, etc. Many bulb and stem styles and angles. Ranges minus 40° to 950°F. or equivalent Centigrade. Illustrated,
No. 1185385, $39.05

*Reg. U.S. Pat. Off.

Bi-Metallic Dial Thermometer
Gives high degree of accuracy at low cost. All-metal stainless steel construction. 3" or 5" diameter case. Stems 4", 6", 9", and 12". Separable wells, ¾" and 1"; 2" extension neck for 6" and 12" stems. Ranges from minus 40° to +750°F. Ranges up to 400°F. damped against vibration. $16 to $27.25, depending on dial size and stem length.

Taylor Instruments
MEAN ACCURACY FIRST

Your Best Single Source for REFRIGERATION AMMONIA COMPONENTS



HOWE AMMONIA BOOSTER COMPRESSOR for low temperature refrigeration service.

HOWE POLAR CIRCLE COILS for freezer storage service

HOWE RAPID FREEZE UNITS for blast freezing

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Since 1912, specialists in refrigeration engineering. Consult Howe today, no obligation.

COMPRESSORS 5 to 150 Tons

ACCUMULATORS

BRINE COOLERS

FIN & PIPE COILS

CONDENSERS Evaporative Shell and Tube

SURGE DRUMS

UNIT COOLERS

FLAKE ICE MAKERS 1 to 15 tons

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PRESS BRIEFS

Low Temperature Research At Chicago University

THE nation's largest non-commercial laboratory for low-temperature research has been installed at the University of Chicago. The $440,000 laboratory, a new addition to the university's Institute for the Study of Metals, can produce fourteen gallons an hour of liquid hydrogen and helium at temperatures close to absolute zero, or minus 460 F.

Such super-cooling allows scientists to make slow-motion studies of molecular activity. Particular studies will involve the virtually frictionless flow of liquefied gases, their defiance of gravity, and such super-cool behavior as the virtual elimination of electrical resistance in super-cooled lead. Liquid helium comes at minus 435 F with the temperature controlled by vacuum pumpers to within 1-10,000th of a degree. Liquid hydrogen at minus 423 F is also used by nuclear scientists in collision experiments with cosmic rays and synchrocyclotron beams. While liquid gases are produced commercially, Chicago's new laboratory will produce these liquids in quantities never before made available for research.

Since 1945, physicists, chemists and metallurgists at Chicago have been conducting low temperature experiments under the West Stand of Staff Field where, in 1942, the late Enrico Fermi set up the nation's first atomic pile.

Thermo King – A. V. Roe Form New Canadian Company

THE formation of a new Canadian company, The Canadian Thermo Control Company of Montreal is announced by Thermo King Corp., Minneapolis, and A. W. Roe, Canada, Ltd., Toronto. The agreement reached with the Canadian firm provides for a long-term manufacturing license for truck trailer and railway refrigeration units under Thermo King Patents, J. A. Numero, head of the Minneapolis firm, said. The new firm will manufacture and market all Thermo King products in Canada, the United Kingdom and sterling bloc countries.

New Canadian Freezing Plant

CONSTRUCTION has started on a $700,000 food-freezing and processing plant at Sherwood, near Charlottetown, Canada, P.E.I., W. H. Heeney, president of Heeney Frosted Foods Ltd., of Ottawa and La Prairie, said. The plant is expected to be in operation by June of next year. To operate it, a new company, Prime Edward Island Frosted Foods Ltd., has been formed.

Kroger Expands Freezing

REFRIGERATION and air conditioning will have an important role in a new expansion program announced for the food distribution center of the Kroger Co. on Hill Ave., Toledo, Ohio. Carl S. Fuller, vice president of the Toledo division, said an 80,000 cubic foot freezer room will be included in the project. Other plans for protection of products include air conditioning of the entire 720,000 cubic foot fresh fruit and vegetable section.

New Armalite* Insulation is strong, light, efficient

Armstrong Armalite is a brand-new, board-form insulation for cold rooms operating at temperatures as low as minus 50° F. Armalite is a white, cellular material with an unusually low K-factor of 0.24 Btu at 70° mean temperature. It's light in weight for easy handling, only 1.25 lbs. per cubic foot—yet has ample strength to resist on-the-job breakage and to support loads. Armalite has a resilience that allows tight joint construction, and its dimensional stability in service is excellent. Boards are 12" x 36", in 1", 1½", 2", 3", 4", and 6" thicknesses.

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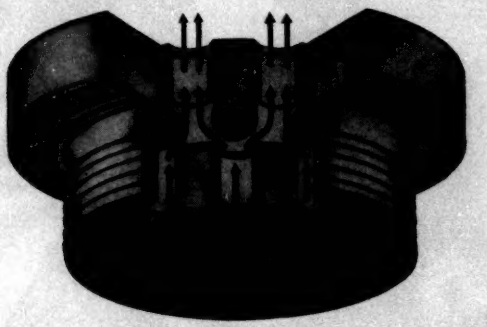
INCREASES THE PERFORMANCE OF ANY COMPRESSOR—OLD OR NEW



New "BV" Ball Valve passes 26% *more gas* in actual tests conducted by a leading independent research organization. Users report amazing increases in performance when they install Ball Valves. And, not one report of failure in operation—Ball Valves are free from valve breakage!

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VALVES CARRIED IN STOCK FOR LEADING HEAVY DUTY COMPRESSORS

Liquid Carbonic Merges With General Dynamics Corp.

DIRECTORS of General Dynamic Corp. and Liquid Carbonic Corp. have approved in principle a transaction under which Liquid Carbonic would become a division of General Dynamics, it was announced by Frank Pace, Jr., General Dynamics president, and Rex L. Nicholson president of Liquid Carbonic.

An exchange of stock on a one-for-one basis is contemplated, according to the announcement. Mr. Nicholson would retain his position as senior executive officer of the new division and "with appropriate representation of Liquid Carbonic's present directors on the General Dynamics board." Liquid Carbonic is described as the world's largest producer of carbon dioxide and the nation's fourth largest producer of oxygen, acetylene and medical gases, with plants in U.S.A., Canada and South America.

Human Occupancy In The Enviromental Chamber

A paper appearing in the third quarter 1957 issue of *Environmental Quarterly*, the official organ of the new institutes carried a topic on "Human Occupancy in Environmental Chamber" by Stuart Giles, Bemco, Inc. According to the article, many researchers engaged for the first time in this type of work, did not realize the hazards involved. Personnel have been known to lose tips of their noses and earlobs due to unsuspected frost bite.

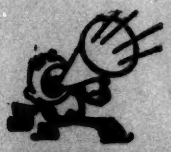
Mr. Giles and the publication state: "The 'sports' who run into the minus 65 F chamber in street clothes to make that quick adjustment of the test equipment should be locked out. A few good whiffs of sub-zero air can frostbite the lung tissue . . . The best safety device is common sense." In his article Giles points out the oxygen and vital combustion requirements that have to be taken into consideration, shock and vibration hazards, suffocation and poisoning. His paper dealt with temperature and humidity problems, explosion and fire hazards, radiological problems and design considerations of the environmental chamber.

City Products Sales Up

NET earnings of City Products Corp. in the first quarter of the new fiscal year were $1,350,724, equal to $1.08 a share. That compares with $1,293,042, or $1.03 a share, for the corresponding period in 1956. Net sales in the three months ended June 30 totaled $26,639,391, compared with $22,337,386 in the first quarter last year. Directors declared a quarterly dividend of 62½ cents a share, payable September 30, to stockholders of record September 13. Wm. J. Sinek, chairman said he believes the "upward trend of earnings should continue" during the remainder of the year.

New Warehouse to Raleigh

A NEW cold storage warehouse, which would eventually contain 1,250,000 cubic feet of space, is being planned for Raleigh, N. C., it was announced recently by P. O. Poole, head of the Southeastern Bonded Refrigerated Warehouse, Inc. Construction of the first unit, which will have 165,000 cubic feet of space with minus 10 F temperature, is expected to start at once and be ready for use by the fall.



In the Spotlight

RAPID MATERIALS handling of both raw and finished products, consolidation of processes into a single plant, employment of four temperature levels for refrigerating, cleaning-in-place of process equipment, and other labor-saving, efficient, safe and sanitary engineering applications are incorporated in the new Carnation-Seattle plant. All systems are distinguished by modern remote controls, and for the most part are nearly completely automatically operated. Combination of cheese making, milk processing and ice cream manufacturing was seldom the rule a decade ago. At Carnation it makes possible the use of process utilities from the same central plant and more flexible use of personnel. End result: a better quality product at more competitive cost to consumer. See story starting on page 13.

ORANGE in the title of a Co-op, or in the name of City, doesn't always mean that the firm or Co-op deals in citrus, or that the Community is conducive to such fruit growing. In the case of the Orange Fruit Growers Co-operative Cool Stores, Ltd., Orange, N.S.W., Australia, the noun describing this common and popular edible in the U.S.A., is properly used in the title of the Co-op and the city, but the fruit grown thereabouts are apples, and pears—not oranges! See page 17.

A WAREHOUSE for storage of perishables has been completed and put in service at Miami by The Associated Grocers of Florida. The new building adds nearly 10,000 feet of refrigerated space compared to only 1,000 in the former building. The new facility has separate compartments for fresh produce, frozen foods, and a breakup room for small frozen food orders. Unique features include underground tunnels to eliminate frost under the freezer floor and use of air condensers for cooling water. For illustrated description of this new plant see article starting on page 20.

AN ICE manufacturer in Watsonville, California has added a new sideline, that of distributing cylinder gas equipment. He covers an area some 150 miles up and down the Central California Coast in which he sells some 500 items. For story of this merchandising venture see page 25.

HOW PRACTICAL are heat pumps for commercial and industrial use? What about solar heat energy applications? These questions asked of Industrial Refrigeration as they are of many other publications, were answered to an extent by Prof. R. C. Jordan, Head, Mechanical Engineering School, University of Minnesota, at the American Power Conference in Chicago, March 1957. Prof. Jordan uses two specific examples: one, to show that heat pump applications are practical at a location such as the Southdale project; and, two, solar energy has been effectively harnessed in the Southwest. See page 25.

FIRST CHICAGO Convention for NAPRE in 20 years is scheduled for November 18-21. Special consideration was given this year to the possible desire of members to visit the 10th All Industry Show of the Air Conditioning and Refrigeration Industry, also being held in Chicago on those dates. Therefore, the business and educational sessions will be held at non-conflicting times. For details see page 42.

AN INTERNATIONAL Trade Development Committee has been formed by The Institute of American Poultry Industries to conduct market exploration and developments of poultry and eggs in nine foreign countries. For report see page 31.

PEAK SUMMER operations bring customary Fall overhauls of refrigerating equipment. Well managed and efficiently engineered plants plan these maintenance periods. However, even the most alert owners and practical engineers often overlook the opportunity to review other operating costs—and plan for their reduction before next season. M. E. Bell, Supervising Engineer, Sick's Enterprises, Seattle, makes suggestions on how to reduce utility costs. See page 34.

...I ALWAYS THOUGHT YOU WERE SOLE OWNER OF YOUR REFRIGERANT BUSINESS, ED.
I AM, TOM...
...AND I'VE BUILT IT INTO A NICE
YOU SEE, I'M A LOCAL DISTRIBUTOR AND
ABLE TO OFFER MY CUSTOMERS
DELIVERY AND PERSONAL SERVICE...
...AND HERE'S THE PARTNER I SPOKE OF... BARRETT BRAND CYLINDER AMMONIA.
WHAT'S SO SPECIAL ABOUT IT?
"IT'S THE PURITY, TOM. AT THE NITROGEN DIVISION PLANT THEY TEST EACH CYLINDER FOR PURITY, AND EACH VALVE FOR TROUBLE-FREE OPERATION."
SO YOU SEE, TOM—I SUPPLY THE SERVICE... BARRETT AMMONIA SUPPLIES THE PURITY. TOGETHER WE'RE ABLE TO OFFER YOU BETTER AMMONIA SERVICE!

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Portland: Acme Engineering Co., 46 Market St.

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St. Louis: McKesson & Robbins, Inc., Chemical Div., 904 Landreth Bldg., 320 N. 4th St.
St. Louis: G. S. Robins & Co. 126 Chouteau Ave.

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Omaha: McKesson & Robbins, Inc., Omaha Div. 902 Farnam St.

NEW JERSEY
Edgewater: Nitrogen Div. Allied Chemical & Dye Corp., 1 River Road
Paterson: Lotte Chemical Corp. 109 5th Ave.
Paterson: Seaboard Industries 195 Keen St.
Paterson: Wollen Chemical & Supply Co., 126 6th Ave. P. O. Box 1659

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Albany: Albany Laboratories, Inc., 67 Howard St.
Bklyn: Tex-Ite Products Corp. 555 Park Ave.
Buffalo: Commercial Chemicals, Inc., 211 Hertel Ave.
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New York: Nitrogen Div. Allied Chemical & Dye Corp., 40 Rector St.
New York: N. H. Heyman, Inc., 168 E. 91st St.
New York: E. M. Sergeant Pulp & Chemical Co. 7 Dey St.
Poughkeepsie: Duso Chemical Co., Inc., Fulton & Fairview St. P. O. Box 665
Rochester: Wm. B. Duffy Carting Co., 62 Scio St.

NORTH CAROLINA
Charlotte: American Cyanamid Co., 3333 Wilkinson Blvd.

OHIO
Cleveland: Harshaw Chemical Co., 1945 E. 97th St.
Cincinnati: Merchants Chemical Co., Inc. 2933 Spring Grove Ave.
Toledo: Ohio Inland Chemical & Solvent Corp. 1775 Dorr St.

OKLAHOMA
Okla. City: Rex Engineering & Sales Co., 2735 N.W. 10th St. P. O. Box 5141
Tulsa: Vaughn Chemical Co. 1102 E. 3rd St.

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Altoona: Western Pennsylvania Chem. Co., Inc., 4125-41 6th Ave. P. O. Box 703
Avoca: Lunex Chemical Works, Inc., Box 7
Pittsburgh: Thomas Knoch 244 Bascom St.

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Newest of the Pacific Northwest dairy installations is this plant dedicated in July.

Automatic Equipment Speeds Handling In New Combined Milk and Ice Cream Plant

CARNATION Company's new, ultramodern fresh milk and ice cream plant serving Western Washington was formally dedicated at ceremonies in Seattle on Monday, July 22. Located on approximately nine acres at 2746 East 45th Street near the University of Washington, the plant has 133,000 sq. ft. of working area under roof. The two-story main plant (201 ft. x 292 ft) contains 111,501 square feet of floor space. Ice cream hardening and processing rooms occupy 17,326 sq. ft. and areas involved with milk processing and refrigerated milk storage, 20,115 sq. ft. The garage building, with mezzanine storage area, contains 16,166 sq. ft. of floor space.

Equipment of particular interest includes specially designed tunnels and conveying system which prevent any frost from entering the hardening room. The completely automatic novelty system is capable of turning out 1200 dozen per hour. Other noteworthy items include automatic casing for milk cartons; automatic combining and stacking of milk cases, remote control sanitary valves; automatic liquid wax systems; centralized chilled water and tower water systems; circulated liquid ammonia refrigeration system; completely automatic boiler room and automatic

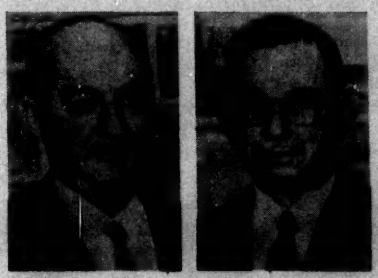


Fig. 1—Participants at formal opening ceremonies of the ultramodern, new Seattle fresh milk and ice cream plant included Elbridge H. Stuart (r), chairman of the board, and Alfred M. Ghormley, president of Carnation Company.

liquid sugar and corn syrup systems for ice cream mix making.

Completely tiled, the cottage cheese room is equipped with a special air conditioning and filtration system. The loading platform has a dock level conveyor for loading cased milk into relay vans and wholesale trucks. Both wholesale and retail trucks have their own space and need not be moved after parking at the plant. Empty cases are unloaded and full cases loaded directly from the filler at the permanent locations.

The new plant employs more than 420 men and women. It is capable of producing 40,000 gallons of milk a day and three million gallons of ice cream a year. Both capacities are readily expandable.

Participating in the dedication ceremonies were leaders of industry, business, education and political life together with Carnation's chairman of the board, Elbridge H. Stuart, and president, Alfred M. Ghormley pictured in Fig. 1. The Seattle plant, President Ghormley explained, is as fine as today's engineering and dairying science skills can provide.

Special features of the dedication events which extended over the full week (July 22-26), included open house for the dairy industry and press; for home economists, dietitians and employees; for producers and wholesalers, and general public and customers in that order.

Complete Milk Production

The new Seattle Division markets a full line of fresh dairy products, this includes pasteurized and homogenized milks, a variety of creams, and cottage cheese. Frozen dairy products include a complete variety of ice creams, ice milks and novelties.

In Western Washington, Carnation's

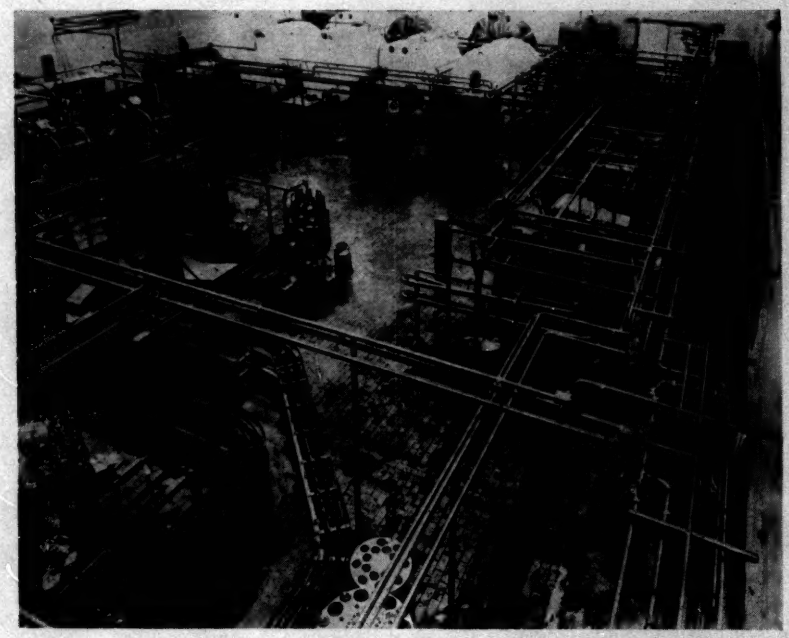


Fig. 2—Ultramodern milk processing room of Carnation's new Seattle Plant. In the right foreground is the Canco No. 176 filler; in center of picture are two No. 334 Canco fillers; in left background are two junior half-gallon Pure-Pak fillers equipped with liquid wax and automatic glue feed. Production from the Pure-Pak is automatically cased. Storage tanks are seen in the background.

To the right are located two HTST pasteurizers and homogenizers. On right wall are the pasteurizer control panels. In this area is the recording thermometer which automatically records temperature from 16 locations, and a panel of 16 liquid level gauges showing the volume of products in the storage tanks. Also in the area is the push button control which operates the automatic inlet and outlet valves on the surge tanks.

market territory is largely centered in the Puget Sound area. Seattle, Tacoma, Bremerton, Port Angeles, Port Townsend, Snoqualmie, Falls City, Everett, Bellingham, Snohomish, Arlington, Enumclaw, Kent, Auburn, Puyallup, Marysville, Sedro Wooley and Mount Vernon, are some of the larger cities and towns in this territory. The new plant is served daily by a fleet of 21 tank trucks which bring in the bulk product from 416 milk producers, including Carnation's own farms. These producers are located in Western Washington State's King, Pierce, Snohomish, Skagit, Thurston and Whatcom counties. The insulated tank trucks vary in capacity from 1500 to 3500 gallons.

Property Development

Carnation's new property, purchased in 1950 was at that time a generally undeveloped area. Storm and sanitary sewers were more than 800 feet away from the building site and some 30 feet above ground level. The nine acre property, approximately 400 by 1,000 feet in dimension, was reclaimed lake bottom. At the time of the purchase the water table was approximately one foot beyond the ground level. There was an overlying layer of peat with an average depth of 15 feet in the building and the working yard area.

The major problem involved in property development was to stabilize the yard sufficiently to permit paving and the handling of heavy trucks. Exhaustive tests were made of the peat, and it was determined that a minimum of 8 foot of fill would be required to compress the peat sufficiently to arrive at a stable level. The tests also indicated that this settlement would take place over a period of nine months to one year. The 8 feet fill provided a net increase in yard level of three feet. The remaining five feet of fill being used to compress the peat. In other words, the 15 foot peat layer was compressed to a 10 foot peat layer.

Peat removal amounted to more than 8,000 yards. There was also some rubble and unsuitable soil removed exceeding 9,000 yards. A total of 130,000 yards of fill was placed on the property. Breaking the cost down into units, it cost approximately $57,000 for every foot of increased yard elevation. Accordingly, the fill was held at the minimum amount required to stabilize the yard. Final elevation was still about four feet below street level. All buildings were placed on piling. Approximately 2,000 piles, an average 35 feet in length, were required. However, the location is especially good from a distribution standpoint, being located on a main thoroughfare.

Processing Areas and Shipping Facilities

Floor plan of the new plant is arranged in such a manner that the raw product is received at one side of the building, moves through the various process steps and production levels to the opposite side or end of the building.[1] For a breakdown of the floor area allotments to manufacturing, processing, warehousing and materials handling in the Seattle Carnation plant, see Table I.

Table I—Floor Areas Allocated to Various Process Areas in the Carnation Company Seatle Plant

	Manufacturing	Refrigerating	Warehouse & Materials Handling
Ice Cream	5830	7590*	
Milk	8840)		
	)	3175	8100
Cheese	3280)		
Raw Materials	2140	1070	5040
Containers			13745
Clean up	695		
	20,785	11,835	26,885

*Includes 600 sq. ft. of ice cream freezing tunnels.

In the exterior view of the plant at top of title page, can be seen (at the left) the tanker receiving area. Behind the 201 x 292 ft. main plant extend two load out docks. One, accommodates 49 wholesale trucks and five relay vans. The other dock accommodates 73 retail trucks. At the rear of the 9-acre site is located the completely equipped garage.

Process Plant Highlights

All incoming milk is run through a standardizing clarifier and plate cooler, immediately cooling the milk to 36 F. Two high temperature short time pasteurizers process all raw milk and mix. Inlet and outlet valves for the balcony located surge tanks are

[1] INDUSTRIAL REFRIGERATION described the Carnation plant during its planning stages in an article in the May 1955 issue. Fig. 5, page 41, showed a mock-up of the plant. There is very little change between mock-up shown at that time and the finalized milk processing plant in Seattle today.

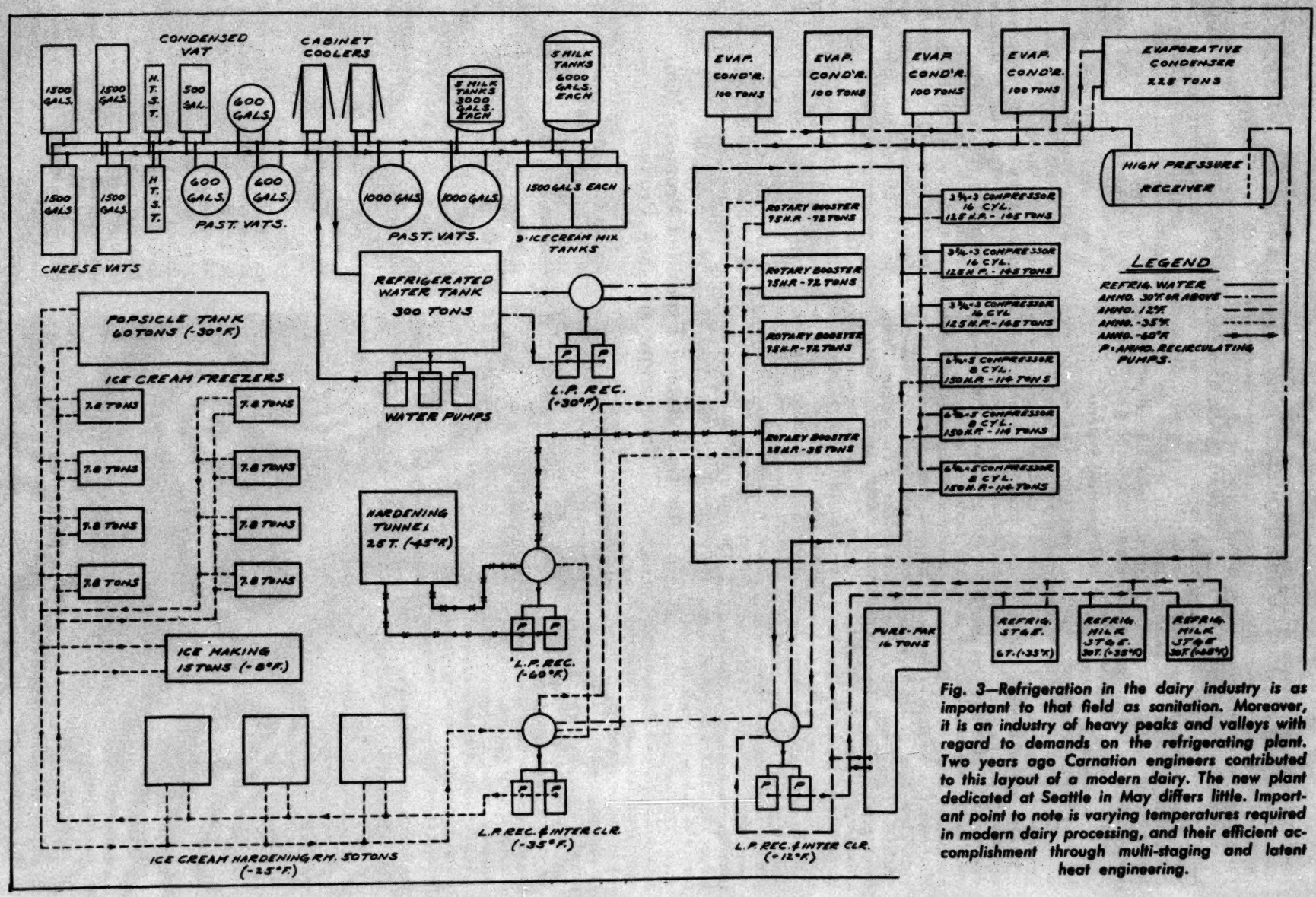

CONDENSED VAT
CABINET COOLERS
1500 GALS.
1500 GALS.
N.T.S.T.
500 GAL.
600 GALS.
5 MILK TANKS 3000 GALS. EACH
5 MILK TANKS 6000 GALS. EACH
EVAP. COND'R. 100 TONS
EVAP. COND'R. 100 TONS
EVAP. COND'R. 100 TONS
EVAP. COND'R. 100 TONS
EVAPORATIVE CONDENSER 225 TONS
HIGH PRESSURE RECEIVER
CHEESE VATS
PAST. VATS.
1000 GALS.
PAST. VATS.
1500 GALS EACH
3 ICE CREAM MIX TANKS
REFRIGERATED WATER TANK 300 TONS
WATER PUMPS
POPSICLE TANK 60 TONS (-30°F.)
ICE CREAM FREEZERS
7.8 TONS
ROTARY BOOSTER 75 H.P. - 72 TONS
ROTARY BOOSTER 75 H.P. - 72 TONS
ROTARY BOOSTER 75 H.P. - 72 TONS
ROTARY BOOSTER 25 H.P. - 35 TONS
3 3/4 x 3 COMPRESSOR 16 CYL. 125 H.P. - 145 TONS
3 3/4 x 3 COMPRESSOR 16 CYL. 125 H.P. - 145 TONS
3 3/4 x 3 COMPRESSOR 16 CYL. 125 H.P. - 145 TONS
6 3/4 x 5 COMPRESSOR 8 CYL. 150 H.P. - 114 TONS
6 3/4 x 5 COMPRESSOR 8 CYL. 150 H.P. - 114 TONS
6 3/4 x 5 COMPRESSOR 8 CYL. 150 H.P. - 114 TONS
L.P. REC. (+30°F.)
HARDENING TUNNEL 25 T. (-45°F.)
L.P. REC. (-60°F.)
ICE MAKING 15 TONS (-8°F.)
L.P. REC. & INTER CLR. (-35°F.)
ICE CREAM HARDENING RM. 50 TONS (-25°F.)
L.P. REC. & INTER CLR. (-12°F.)
PURE-PAK 16 TONS
REFRIG. STAGE. 67. (-33°F.)
REFRIG. MILK STAGE. 30T. (+38°F.)
REFRIG. MILK STAGE 30T. (+68°F.)
LEGEND
REFRIG. WATER
AMMO. 30°F OR ABOVE
AMMO. 12°F
AMMO. -35°F
AMMO. -60°F
P = AMMO. RECIRCULATING PUMPS.

Fig. 3—Refrigeration in the dairy industry is as important to that field as sanitation. Moreover, it is an industry of heavy peaks and valleys with regard to demands on the refrigerating plant. Two years ago Carnation engineers contributed to this layout of a modern dairy. The new plant dedicated at Seattle in May differs little. Important point to note is varying temperatures required in modern dairy processing, and their efficient accomplishment through multi-staging and latent heat engineering.

remote controlled and equipped with remote reading level gauges. All can be controlled from the main floor pasteurizing area. Remotely controlled valves handle switching from hot water to tower water to chilled water on the pasteurizing equipment.

Packaging equipment includes automatic casing for Pure-Pak cartons. Hooked up with this equipment is an automatic liquid wax system. The wax system features a nitrogen blanket over the wax to prevent oxidation. (Fig. 2 is a view of the milk processing floor.)

Package product handling includes an automatic selector which combines cases from three conveyor lines onto one. The selector will also feed an automatic stacker which will arrange filled cases in a tier three to six cases high. These cases go directly to the wholesale trucks and relay vans. Loading platform is equipped with a dock level conveyor. Each truck has its own space at the load-out conveyor.

In the ice cream department, raw products storage tanks are equipped with air operated automatic outlet valves which are remotely controlled from the mix weigh tank. The plant utilizes 2-compartment flavor vats with 150 gallons in each compartment. The ice cream plant is equipped for liquid sugar, and liquid corn syrup. These are automatically fed to the ice cream mix pasteurizers through meters which can be pre-set.

A view of the ice-cream processing room is shown on the cover. The completely automatic novelty system is rated at 1200 doz. per hour. The hardening room is equipped with especially designed tunnels and conveying system to prevent any frost forming in the hardening rooms.

Sanitation and Laboratory

Every conceivable sanitation provision has been built into the new plant, Henry C. Weber, Seattle Division General Manager, indicated. All sanitary piping is washed, for example, by the automatic cleaned-in-place washer. The entire plant has been divided into six circuits. The washer is located in a room central to the processing area. By means of manifolds and remote operated valves, all units of process equipment or circuits of piping between equipment can be cleaned without removal.

Weber explained that the plant has one of the best equipped laboratories for quality control anywhere. area and its considerable remote con- The plant's central location in the area and its considerable remote control and automatic devices are additional factors, he said, which assure that it will provide the best quality products and customer service. He added that it took about a year and a half to construct the fireproof plant, which required 12,434 yards of concrete, 970 tons of steel, 515 thousand units of glazed tile and floor, about 83 miles of electrical wire and about 74,000 feet of pipe.

Refrigerating Systems

Liquid ammonia recirculation is employed in this plant. The many temperature levels required by different forms of processing such as cooling pasteurized milk, manufacturing cottage cheese, freezing novelties, and hardening ice cream, are accomplished through circulation of the ammonia from inter-coolers or receivers maintained at various temperature levels. For a typical illustration of refrigeration in a plant of this type, see Fig. 3. Booster compressors are employed to raise the pressure of gases from the lower pressure receivers and inter-coolers. Such combinations, it has been proven by Carnation engineers, make for very efficient operating.

The plant is equipped with an automatically-controlled chilled water circulating system. Further, an automatically-controlled water-tower circulating system provides additional primary cooling for such operations as raw milk pasteurizing. Carbon ring compressors are utilized to produce oil and moisture-free air for control instruments and air agitation of the raw milk storage tanks.

All engineering for the Seattle plant, including drawings and specifications, was handled by Carnation's own engineering department under the direction of John H. Forslew, assistant vice president; electrical engineering by L. M. Christensen; mechanical engineering, R. M. Lazar; refrigeration, W. R. Gilmore; architectural, D. R. Otey. The project was coordinated by H. S. Christiansen, assistant chief engineer, Carnation Company. Strucural engineering was by S. B. Barnes, consulting engineer, Los Angeles.

The general contractor was J. C. Boespflug Construction Company of Seattle. Sub-contractors were: Northwest Construction Company, fill work; W. E. Beggs, Inc., plumbing and heating; Carlson Electric Co., Inc., electrical work; Ralph E. Manns Company, refrigeration work; Taylor Nurseries, landscaping.

Air Conditioning Exposition Promises Many Innovations and New Products

THE return to Chicago as the site of the Air Conditioning and Refrigeration Exposition for the first time in six years will be marked by many innovations, according to R. H. Israel, sales manager, Virginia Smelting Co., West Norfolk, Va., chairman of the exposition committee. The show, sponsored by the Air Conditioning & Refrigeration Institute, will be held at the International Amphitheatre, November 18 to 21, inclusive.

The show, the tenth to be held, will be the largest in its history. Over 250 companies will display and demonstrate products. Approximately 100,000 square feet of exhibit space, exclusive of aisles and storage areas, will be used. Many companies will show new developments in combined heating and cooling to stress economies in combined systems. Commercial refrigeration fixtures for stores will emphasize styling and marketing as an aid to increased sales.

Industrial refrigeration systems will be shown for manufacturing purposes to meet new requirements not only in the food field but also in such basic industries as metals, chemicals, pharmaceuticals and petroleum, which now rely on low temperatures for manufacturing processes.

Another interesting change is the decision to admit the general public on the last day of the show to allow manufacturers to test consumer demand by market research.

Seven associations and technical societies will hold meetings in Chicago at the time of the show. They include the Air Conditioning & Refrigeration Wholesalers; American Society of Refrigeration Engineers; National Commercial Refrigeration Sales Association; National Warm Air Heating & Air Conditioning Association; Refrigeration & Air Conditioning Contractors Association, Refrigeration Service Engineers Society, and Nation Association Practical Refrigerating Engineers.

"The show has contributed in a large measure during the past decade to the extraordinary development of both commercial refrigeration and air conditioning," said Mr. Israel. "As new methods and products are developed, the exposition provides an opportunity for any executive to see all of them at once. This has meant that technical advances have been absorbed quickly into industry in general, and the growth of our own industry has been an accompanying result."

New Australian Storage Provides Modern Facilities for Storing Fruits

J. J. BUDGE
James Budge Pty. Ltd.
Sydney, N.S.W. Australia

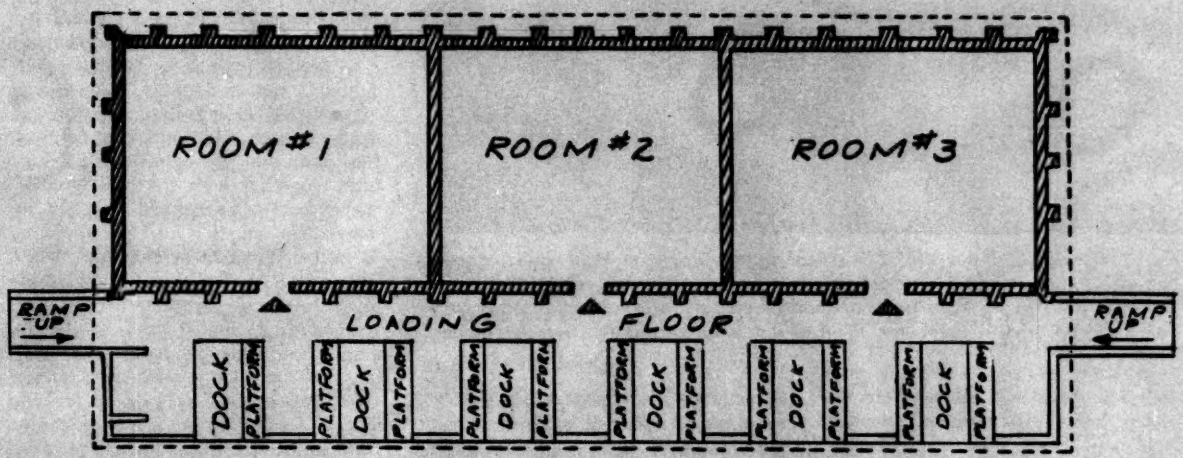


Fig. 1—Floor plan of new facilities for Orange Fruitgrowers Co-op, NSW. Covered truck docks and completely palletized operations expedite product handling. Flat bed transports are side-loaded by fork lifts.

POSSIBLY the largest area growing apples and pears in the State of New South Wales surrounds the City of Orange. Certainly the largest fruit stores in that area are owned by the Orange Fruitgrowers' Co-operative Cool Stores Limited. The total capacity of their storage space is now almost 250,000 cases of apples. The most recent addition is a modern storage having a capacity of 50,000 cases, made up in three rooms, each measuring 63 x 49 x 21 feet.

This extension has been planned to make use of modern methods of handling fruit and of economical building construction. There are no posts located within the area of the room. Loading is done by means of fork lift trucks, the store doors open and close quickly without the operator alighting from his vehicle, and facilities have been incorporated for the rapid unloading of fruit by orchardists when delivering it for storage. See the plan shown in Fig. 1.

Cooperative Service

Since this is a growers' co-operative, in which the fruit is not sold under one brand, but is marketed individually by the various growers, some aspects of organization which apply to this store may not apply to others. For example, the floor area in the room is marked out in rows, and the space allotted by the management to growers is based upon these rows.

The basic design of the warehouse is for the handling of pallet loads, each comprising 40 Australian bushel cases. Within, they are stacked three pallets high by means of a fork lift truck. All loading and unloading operations are carried out under cover, and the fruit is protected from the weather at all times.

The building itself is of modern, structural steel and reinforced concrete construction, with brick curtain walls. Fig. 2 gives an impression of the end of the storage and indicates some features of construction. One of the six loading docks is shown in that picture and a quantity of the pallets is also shown.

Insulation Application

For economy in construction, an unusual method of insulation was

Fig. 2—Modern Australian single story refrigerated storage. Building is of reinforced concrete structure with brick curtain walls. Siding and whole roof is corrugated fibro cement. Concrete truck bays permit quick handling of fruit on 40-bushel pallets.

Fig. 3—Interior of Room No. 2. Vertical batten strips on right wall, conceal one-inch expansion and contraction space between pre-fab insulated panels. Concrete piers along walls and horizontal pipe rails prevent pallet loads from being placed against perimeter. Wall at left is brick partition between rooms.

used. The walls and ceiling were insulated with pre-fabricated panels. Each panel was made up from a wooden framework, sheeted on the interior with waterproof plywood, and packed with Insulwool, over which was applied a bituminous seal. The wall panels were made in sections 6 feet wide and of a height corresponding to the 21-foot internal height of the room. The panels were built on trestles, then hoisted quickly into place by block and tackle. and secured by means of Ramset-fixed studs. The panels were deliberately spaced so as to leave a one-inch gap between them. This gap, which was, of course, sealed from the brickwork itself, was subsequently filled with Insulwool and finished with a cover strip. In Fig. 3 the panels and the vertical cover strips can be clearly seen.

Panel construction was used on all external walls and one side only of the partition walls. The ceiling insulation was carried out in a somewhat similar manner, except that the panels in this case were enclosed completely in waterproof plywood. Although it was necessary to use scaffolding for the erection of the ceiling panels, none was required for the walls themselves.

Pre-cast cell-concrete blocks were applied over the sub-concrete floor, as insulation and a wearing surface of concrete was poured over that, finishing level with the floor of the dock outside the rooms. Product which Australian's call cell-concrete is actually Portland cement aerated by the addition during mixing of a special foaming substance, producing a concrete block containing a large number of air cells. These blocks are produced in varying densities. Common size is approximately 24 x 12 in. They are air dried before installation so as to eliminate moisture, and are not penetrated by openings to provide ventilation or lightness to construction. Each block is solid cell-concrete set in a bed of the same material.

To minimize the possibility of damage of cases while the pallet loads are being put into position, bumper rails, also shown in Fig. 3, were fixed around all four walls of the room. It will also be seen in the same picture that a number of concrete blocks were formed at the lower part of each wall so that adequate air spaces would be left between the pallet loads and the walls themselves, to insure satisfactory air circulation.

A feature unique in Australia, but probably not so in the U.S.A., is the air-operated sliding door, which gives access to each cold room. Fig. 4 shows this door and the operating mechanism, together with the pull handle, suspended in a position where it is convenient for the fork-lift operator to pull it, to open or close the door. The action is fast and smooth, and gives full-width opening access into the room. A similar pull handle is suspended inside the room. The door may be opened or closed from either side. The main door can be locked and a small escape port, operable from inside the room only, is provided in the door as an emergency exit in case of need.

Evaporative Surface

Refrigeration of the rooms is provided by flat-hung ceiling coils ar-

Fig. 4—Horizontally sliding refrigerator door applied to each of the three rooms at the Orange Fruitgrowers Co-op. Door is positioned at the half open point for photo-taking. In operation, a pull of the overhead handle opens or closes the door as may be appropriate. Another pull is located within the room. What appears to be a reach-in, conveyor, or can-pass door within the larger closure, is an emergency escape wicket, operable only from within.

ranged in three layers on both sides of the central aisle (see again Fig. 3). Approximately 10,000 ft of 1¼-inch pipe is used per room, arranged in twelve expansion circuits. Galvanized iron drip trays are suspended beneath the coils, which trays also act as baffles to direct circulation of air over the coils, then through the fruit cases and back over the coils again.

Two control headers with expansion, hot gas defrost and return stop valves are installed for each room, one on each side of the doorway (see again Fig. 3). Although the plant is at present to be operated manually, provision has been made for the installation of a liquid recirculation system at a later date.

Concentric Piping For Liquid and Suction Lines

The new storage is located about 250 feet from the engine room, and the main suction and liquid lines cross two roadways. Structural steel bridges are used to carry the pipes over the roadways. To avoid having the main liquid line exposed to direct sunlight and to secure sub-cooled liquid at the expansion valves the liquid line is run inside the suction line, which is lagged with sectional cork insulation.

A large suction line accumulator is located in the engine room to collect excess liquid ammonia from the room coils. By-pass stop valves are arranged around the accumulator and a connection is made from the compressor discharge header to the accumulator, and another connection from the accumulator to the main liquid line. By disconnecting the accumulator from the suction line and subjecting it to condenser pressure, any trapped liquid is quickly forced into the main liquid supply line, for re-expansion in the coils.

Existing refrigeration plant has a capacity of about 100 tons and takes care of about 150,000 cases of fruit including the recent addition. It was not necessary to add additional compressors or condensers for the new Store, these having been provided at an earlier stage of the development with a view to the extension. The new suction line accumulator is connected into the main suction header in the engine room on the one side and on the other side to the recent addition.

The general design and the refrigeration installation were the responsibility of James Budge Pty. Ltd., of Sydney, N.S.W. The co-operative's architects and other specialists dealt with construction and various subcontracts.

Industrial Air Conditioning a Booming Market

AIR conditioning, which claims to be the nation's fastest-growing—and most topical—industry, shows no sign of slowing its heated pace, according to a feature article in the New York Herald Tribune.

When people really began to do something about the weather, it says, a giant new industry burst out of its baby clothes. A side benefit was the end of the inevitable summer query: "Is it hot enough for you?"

Sales today for the entire climate-control field approach $3,500,000,000 a year and the growth potential is immense.

Cloud Wampler, chairman of Carrier Corp., notes, "Sales of air conditioning in the last two decades have gained 6,000 per cent. An equal growth, dollar-wise, is looked for in the immediate future."

In Office Buildings

More than $1,000,000,000 of last year's volume came in large-unit, job-engineered installations for office buildings. Just since World War II, some seventy-one multi-story buildings have been added to Manhattan's skyline. Still another development that has warmed air conditioners' hearts is the installation of full central cooling systems in twenty-four major New York skyscrapers in the last four years.

The trend cannot be traced entirely to bosses' altruism, however. Guesses vary as to how much efficiency jumps when air conditioning becomes an office fixture. But every one agrees that office help churn out more work under air-cooled conditions.

Time Gained

Former United States Commissioner of Public Buildings W. E. Reynolds estimates that the cost of air conditioning is paid off by an increase of seven minutes in "effective time" of an office employee's 480 minutes a day—the time required for two trips to the water cooler.

Mr. Wampler says air-conditioning installation and operating costs in an office building average $60 to $70 a year an employee. This is an increase in efficiency of 1 to 2 per cent offsets the cost of cooling, Mr. Wampler adds.

Absenteeism during the summer heat also is reduced by four or five days in air-conditioned offices, some companies assert.

Many employees in cooled offices prefer eating lunch at their desks rather than face Manhattan's noontime summer temperatures. And, some firms report, workers are reluctant to leave their refrigerated sanctuaries come quitting time.

Assorted formulas are offered by management in arriving at when it's time to send employees home during heat waves. A popular one is the "100-103." If the temperature, plus one-fifth of the humidity reaches a total of 100, or if one thermometer hits 103, it's time to declare a holiday.

A less scientific approach is simply put: "Play it by perspiration."

Typical of cooling units installed in Manhattan buildings in recent years is the main office of Bankers Trust Co. The $3,000,000 project is operated by a massive control board far below the clamor of Wall Street.

The bank's weatherman can set temperatures of varying degrees in all sections of the thirty-one-story structure.

Untapped Markets For Air Conditioning

By the end of the year Bankers Trust plans to have all its forty-three branches air cooled. At present, forty offices have the accommodation.

The biggest untapped market for air conditioning is believed to be in factories. D. C. Minard, president of Trane Co., says only about two percent of the factories in this country are air cooled, yet the total floor space is fifty times greater than the area in office buildings. Mr. Minard estimates that by 1965 about half of the factory space in the South will be air conditioned.

R. G. Jones, general manager of the air conditioning division of General Electric Co., points out that more than $50,000,000,000 will have gone into industrial research by 1960.

"Demands for highly engineered electronic machines," he believes, "and myriad new materials used in the manufacture of undreamed-of consumer items will require exacting indoor climate control in the processing of these products."

Bruce D. Henderson, vice-president of the air conditioning division of Westinghouse Electric Corp., sees the day when cooled air will be universal.

"It will never be seen, felt or heard—it will just be everywhere," Mr. Henderson predicts. "It will be taken for granted, just like the air we breathe."

Associated Grocers Complete Million Dollar Warehouse at Miami, Florida

Fig. 1—New from top to bottom in equipment and methods, this modern 110,000 sq. ft. warehouse is the million dollar home of the Associated Grocers of Florida located at 6695 N.W. 36th Ave., Miami, Fla. Offices are air conditioned and there is a 10,000 sq. ft. refrigerated section.

SPECIAL attention was given to the refrigeration facilities of the new million dollar warehouse which recently marked the third expansion of the ten-year old Florida Coop Associated Grocers of Florida, with headquarters in Miami. Evidence that the planners were looking ahead can be seen in the fact that the new building has 10,000 square feet of refrigerated area as compared to 1000 in the old location. Confidence of even more rapid growth in the future was expressed by General Manager Tom W. Smith who predicts the need for enlargement of their new 110,000 square foot building within three years. When this time comes, or sooner if necessary, zero storage space can be increased by a few changes or adjustments to the thermostatic controls.

The present refrigerated area is divided into three compartments. One has an eight-carload capacity for fresh produce. Another is devoted entirely to below zero storage of frozen foods. A third room 24 x 55 feet serves as a breakup room for filling small frozen food orders. This room which is a vestibule to the low-temperature room is now kept at about 35 F and is also used to store dairy goods. At any time this section can be converted to below zero.

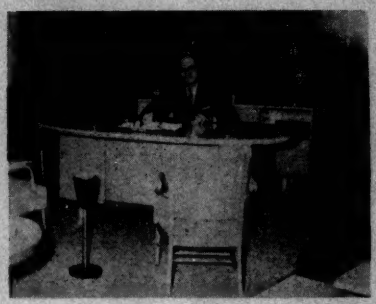


Fig. 2—Tom W. Smith, General Manager of Associated Grocers of Florida, in his office at the new warehouse completed in June.

Two 20 hp, two 10 hp, and two 5 hp Brunner compressors are arranged on a multiple hookup so that temperatures can be dropped at any time without adding more equipment. This hookup also provides a safety factor in the event of sudden load increases or failure of some equipment. For hurricane protection there is a 30 KW Buda diesel standby unit. A Thermobank control system defrosts automatically with hot gas. The refrigerant is "Freon-12".

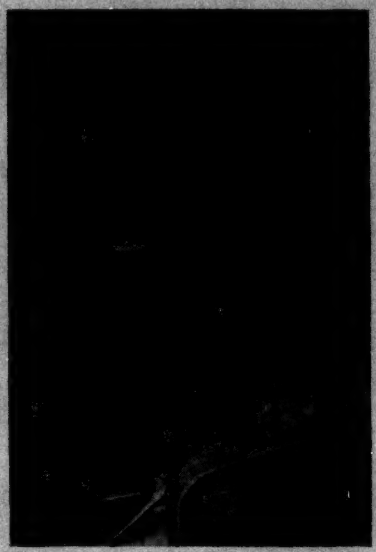
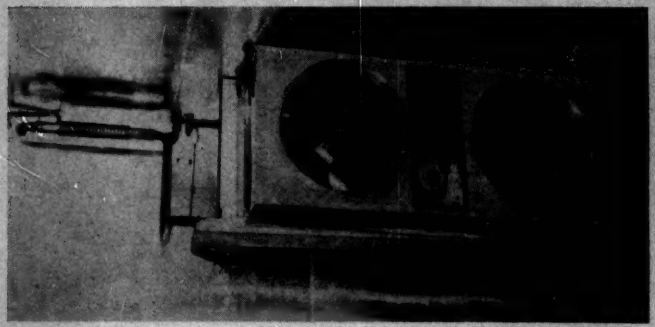
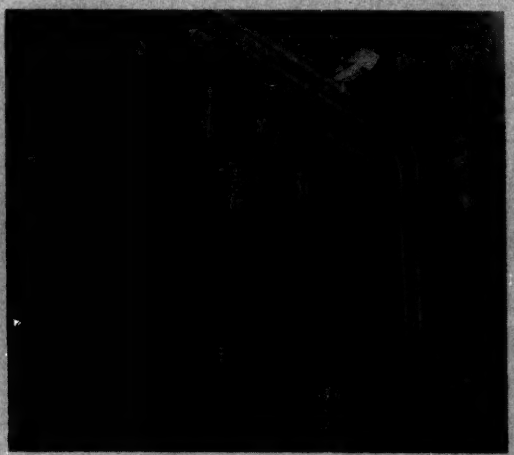


Fig. 5—Three of six Brunner compressor units are on multiple hookup so that overloading of any one of three refrigerated rooms will provide extra capacity from another compressor. This also provides safety factor if one unit has operating difficulties.

Fig. 3—(below) Twin fan freezer coils in the below zero storage room of Associated Grocers of Florida. Wall and ceiling insulation is Alumiseal. Fig. 4—(right) Closeup of cooling equipment in the higher temperature refrigerated rooms at the new warehouse of the Associated Grocers of Florida.





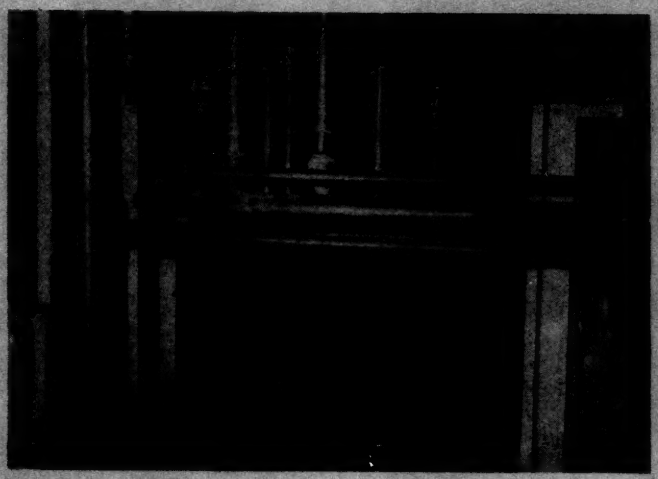


Fig. 6—(left) Underground access leading from compressor room through a series of tunnels under low temperature portion of new warehouse.

Fig. 7—(below) Air from compressor room emerges through these outside vents after having circulated through a series of underground tunnels.

Eliminates Underground Frost

One of the most unusual features of the warehouse, designed by Loyd Frank Vann Associates, is a system of underground tunnels which eliminate the problem of a buildup of frost under freezer floor. About 25 percent of the area under freezer floors is honeycombed with tunnels which lead from the compressor room to outside wall vents. Air from the compressor room is forced through these tunnels with a fan at the main tunnel from the compressor room.

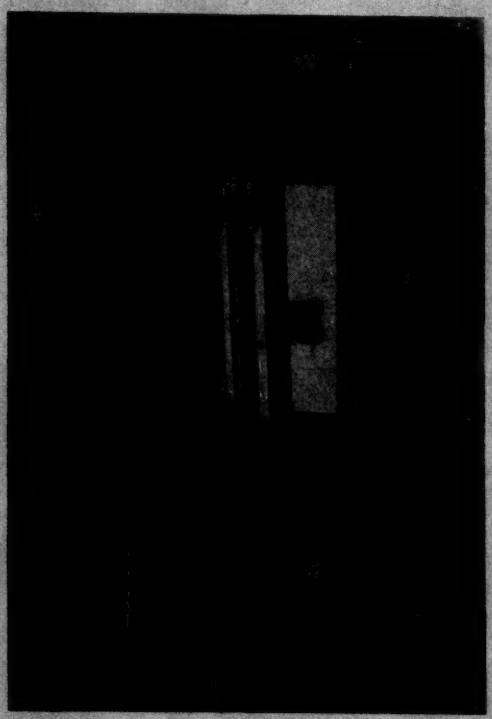
Another unique feature of the warehouse is the lack of water towers. The refrigeration facilities plus thousands of feet of air conditioned office space are served with four Kramer Unicons on the roof. This battery of air condensers utilizes the principle of refrigeration-to-air heat transfer for condensing. No water is involved.

The Unicons are paired up with the compressors as follows: A model BD 2000 serves each 20 hp compressor, Model BD 3200, the two 15-hp units, and a Model BD 1000 operates with the two 5-hp compressors. BD indicates belt-drive.

The largest Unicon, BD 3200 is equipped with two 3½ hp fans 48-in diam., delivering 3200 cfm each at 430 rpm. It is rated at 360,000 Btu/hr. Model BD 2000 has a 1½ hp motor but the same size and speed fan, delivering only 14,800 cfm; however, the unit is rated at 237,000 Btu/hr. Smallest Unicon utilizes a 1 hp motor, 36-in diam. fan at 535 rpm, to handle 9250 cfm for a rating of 120,000 Btu/hr. All unit ratings are based on 40 F suction, 90 F entering air, and 120 F condensing.

Wall and ceiling insulation is with Alumiseal, a combination insulation and vapor barrier system designed and constructed to prevent accumulated condensation of frost or moisture. This method uses thin layers of aluminum foil with a 5/8 to 3/4-inch air space between each layer. There is no insulation beneath the floor slab.

Freezer doors are operated by compressed air so that electric fork lift truck drivers can open and close doors without dismounting. All merchandise is on pallets which are



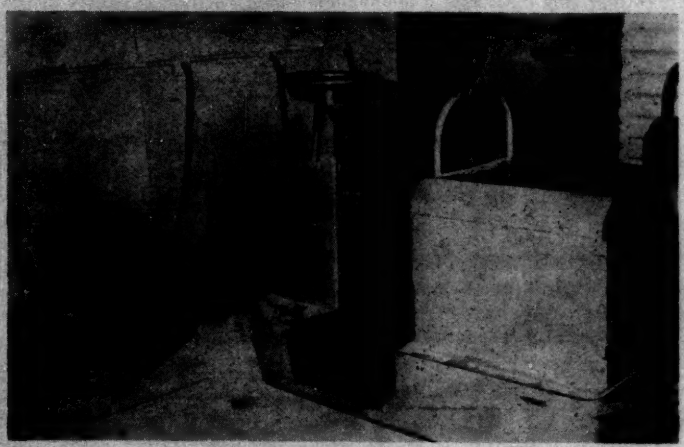


Fig. 8—(left) Compressed air automatically opens and closes heavier insulated doors to refrigerated areas at new warehouse of Associated Grocers of Florida. Auto-closing doors are not so equipped. This is entrance to breakup room and dairy storage. This 24 x 55 foot area is kept at 35° but can be used for below zero storage if necessary. Entrance to zero area is through this room.

Fig. 9—(above) Tractors and fork lift trucks in the new warehouse are battery operated. Two are shown here at charging station.

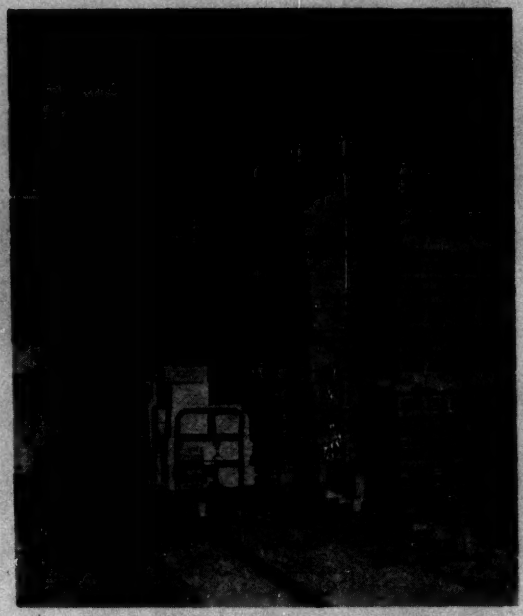


Fig. 10—(Above) Receiving dock for rail merchandise. This dock can handle eight freight cars at one time. Another receiving dock for trucks can take care of 8 tractor trailer trucks at once. A shipping dock on other side of building can handle outgoing goods to ten tractor trailer trucks at one time. The warehouse is using a fleet of twenty-one trucks, three of which are refrigerated, to haul a thousand tons of goods to retail stores each week.

Fig. 11—(Right) One of the 75 four wheeled motorless floats which circle the grocery area at a speed of 90 feet per minute. The 630 feet of conveyor tracks keeps merchandise coming out for delivery or coming in for stocking. Workers detach floats to stack goods with fork lift trucks. Same floats are used for filling orders which are again put on conveyor track and circle warehouse to shipping area.

stored on steel racks under a selective numbering system. This means that goods are stocked and orders filled by number instead of item name. This is said to cut down on errors and also save man hours.

Receiving Dock

A receiving dock can accommodate eight freight cars and eight tractor trailers at the same time. Merchandise for freezer compartments is moved directly from cars to storage with lift trucks and pallets. A separate shipping dock can handle ten of the plant's 21 tractor trailer delivery units at one time. Three of these trucks are refrigerated and delivery to the 200 retail stores is made at least three times a week. The plant is equipped to keep batteries for its fork lifts and electric conveyances, properly charged.

The grocery section of the warehouse which has 4,000 food items valued at 1-1/4 million dollars is also completely palletized. A power conveyor (Towveyor) 630 feet long circles the interior. A fleet of 75 four wheeled motorless floats can be attached or detached at any point in the warehouse and then speeded at 90 feet per minute to their destination for loading or unloading. Transparent bubbles in the roof permit daylight to non-refrigerated portions of the warehouse.

Office Routine

Late model Remington Rand electric billing, tabulating, and other office equipment keeps bookkeeping chores up to date. Electronic card sorting machines with a speed of 800 cards per minute maintain constant records of goods received and shipped. This means that inventory information is always at the fingertips of buyers. It is estimated that the 1-1/4 million dollar stock will turn over at the rate of 17 times per year.

The 201 retail store outlets do an estimated volume of 75 million dollars per year or about 20 percent of all food sales in the 100 mile radius served by the Coop.

The warehouse, located at 6695 N.W. 36th Av., in Miami, includes a complete testing kitchen. Included in the 80 member warehouse staff are three full time merchandising men to assist the retail members with store planning and special promotions.

Protecting Packages From Damage By Fork Trucks

A REPORT to the National Association of Refrigerated Warehouses by James J. Gallery, Quincy Market Cold Storage & Warehouse Co., Boston, Mass., discusses the prevention of damage of fork trucks. To meet the demands of warehouse customers for a faster service, the report states, it was necessary to change to a mechanical operation.

The tool most commonly used in this mechanical operation is the fork truck. This machine requires more space to operate in than that used in a hand operation. A properly trained operator of such a machine can move and stack larger units more efficiently and more economically than ever before. But this machine in the hands of an inexperienced operator can cause great damage to both commodities and property. Even the best trained operator cannot be blamed for damage to commodities caused by his not having the necessary space in which to operate his fork truck.

A common fault in the layout of storage space is that the size of pallet and fork truck are considered, but not enough space, if any, is allowed for overhang on the pallets. This means that space allotted for the operation of the fork truck is cut down in the actual operation. Layouts for a 48 x 40 pallet turn out to be 54 x 44. This means part of the area set aside for aisles is used for storage giving less space for the machine to operate. It reduces the space between stacks and it makes it almost impossible to remove stacks without damage to commodities. To overcome this cause of damage, either more space must be allotted, or make it a rule not to allow containers to overhang the dimensions of the pallet.

Take a tip from those who know refrigeration best!

A. A. Silverman, President
The Vilter Manufacturing Company

"Trouble-free operation of your refrigeration system requires highest purity ammonia.

"Our customers can't afford a plant shutdown or even a slowdown. That's why we charge all new installations with ammonia of the highest purity.

"We advise our customers to continue this care. Old and new refrigeration systems must be kept free of oil, non-condensable gases, water, air—foreign matter usually found in inferior grades of ammonia.

"Always insist on the highest purity ammonia. You'll find it always pays."

Do as so many leading manufacturers of refrigeration equipment do. Use only Armour 99.98% pure ammonia. It's extremely dry and free from all oil and non-condensable gases. Best of all—Armour has 167 cylinder stockpoints from coast-to-coast and 7 strategically located bulk stations—*more than any other manufacturer!* That's why those who know refrigeration best call on Armour for dependable, fast service.

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- ☐ Send me *FREE* Sulphur Tapers and sensitive Test Papers for detecting ammonia leaks.
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Ice Plant Operator Adds Distribution of Cylinder Gas Equipment

ICE manufacturer, Ray Hansen, owner of the Krystal Ice Co. of Watsonville, California, who two years ago began a profitable sideline in dry ice and carbon dioxide gas, has now undertaken a new venture adding to his income. He has taken over the franchise for National Cylinder Gas in an area stretching some 150 miles up and down the Central California coast. In time, he hopes to add a gross of about $1,000 monthly to his income.

But he admits he could have got by on half that amount if he had been pressed for capital. The old building cost him $3,500, and he spent another $500 for windows, paint platforms and repairs. He bought a 2½-ton International truck for $3,000 in which to haul the gases—oxygen, acetylene, nitrogen, helium and other gases. Here again, he says he could have saved money by buying a less expensive truck. For stock, he spent about $1,000. This amount, he says, could have been cut to zero since he could have merely kept catalogs on hand and ordered the equipment from NCG and had delivery within 24 hours.

Ice dealer Ray Hansen wheels large tanks of acetylene to platform and loads onto truck for delivery to customers in Central California. The building, in background, is one he bought for newest expansion to his ice manufacturing firm.

Mr. Hansen bought an old two-story building a few doors from his ice plant. His new business, Krystal Ice & Equipment Co., is part of the parent concern. In the new sideline, Mr. Hansen retails some 500 items. These include several types of gases, welding helmets, hoses, torches, cables, gloves, goggles, alloys and a number of other items.

For his latest business expansion, Mr. Hansen invested a total of $8,000.

Mr. Hansen's best customers to date are farm equipment operators who use oxygen, acetylene and other welding supplies. A close second are wrecking yards up and down the coast. He is gradually expanding his customer list to include hospitals, veterinarians, and ambulance services. Many hospitals are now providing large storage areas for oxygen for patients. In many, you no longer see tanks of oxygen wheeled through the corridors and set up at bedside. Instead, you'll find oxygen tanks in individual rooms and administration requires only the plugging in of an electrical cord. Mr. Hansen presently keeps 200 gas drums circulating among customers and hopes to add more as additional customers are lined up. The tanks are furnished by NCG.

Same Area Covered

One distinct advantage Hansen enjoys is that his gas run includes the same area in which he delivers dry ice and carbon dioxide, the sideline he began two years ago and in which he now has more than 400 customers. Both businesses require only one driver-salesman at the present time. In the expansion two years ago, Mr. Hansen distributes dry ice to the strawberry and vegetable industry. The carbon dioxide, he sells to bars, restaurants, fountains and soft drink bottlers. Of course, he still sells a lot of regular ice in the strawberry and lettuce industries.

Fire Damages California Ice and Cold Storage Plant

FIRE swept through the National Ice & Cold Storage garage, Sacramento, Calif., July 9, destroying the company's local fleet of 14 trucks and causing damage of more than $200,000. The blaze, of undetermined origin broke out about 7:00 p.m. Within minutes the fire spread throughout the garage and a great pall of smoke was visible for miles. In addition to the trucks and garage repair equipment, approximately $20,000 worth of ice chests and $20,000 worth of paper bags used for ice delivery were destroyed.

American Ice Earnings

EARNINGS of American Ice picked up in the first six months, largely because of recent acquisitions in retail coal and retail and wholesale fuel oil distributing operations. Half year net income is understood to have been more than $120,000, equal to about 25 cents a share, up from $73,997, or 10 cents a share reported for the like 1956 period.

Heat Pump and Solar Energy—Their Roles in Space Conditioning

Prof. R. C. JORDAN,
Dept. of Mechanical Engineering
University of Minnesota

This two-level shopping center garden court has an air supply in winter tempered by heat rejected in refrigeration condensing and gas engine exhaust, thus conditioning a space for which cost of more direct heating would be near staggering.

DURING the last half century revolutionary changes have occurred in the artificial control of environments to make them more adaptable to human needs and comfort. The use of fluid fossil fuels in space heating, the virtual elimination of manual control and the addition of effective heat distribution systems have increased the ease and desirability of living in northern climates. Paralleling these trends the rapid expansion of summer cooling has made more bearable the lower latitudes and the hot summer months of the temperature zones. Our burgeoning population will require an expansion of energy demands for both of these applications to meet the 30% of our entire energy consumption in this country which is now needed and will probably continue to be allocated to this purpose during the next century.

Foreseeable fantastic world energy demands and the limited supply of stored energy sources, (particularly the oil and gas fossil fuels which were the real objectives in the recent Suez crisis) will probably make necessary the conversion of coal to fluid fuels within a decade or so (see Fig. 1). This may become the dominant fuel in this country by the end of the century.

Uranium and thorium, with energy assets potentially totaling vastly more than all of our other combined energy resources with the exception of solar energy, will almost certainly emerge at some time in the future as our dominant energy supply. The eventual position of solar energy in competition with other energy sources is more nebulous, but the potentialities are so vast (see Fig. 2) that its

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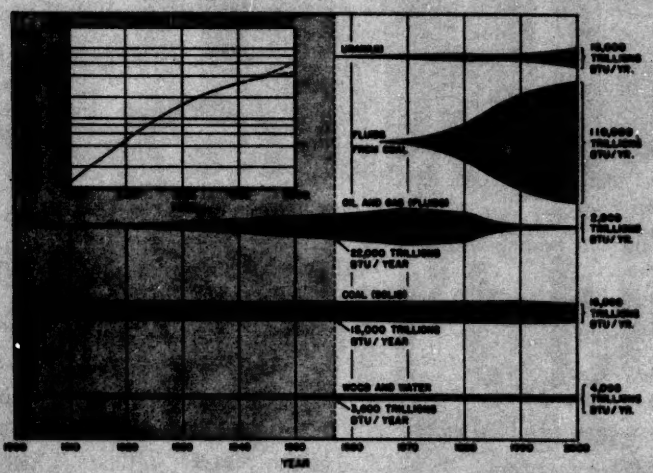
This is an abridged text of a paper by Prof. Jordan, delivered at the 19th Annual American Power Conference, Hotel Sherman, Chicago, March, 1957. The complete paper will appear in the Transactions of the American Power Conference.



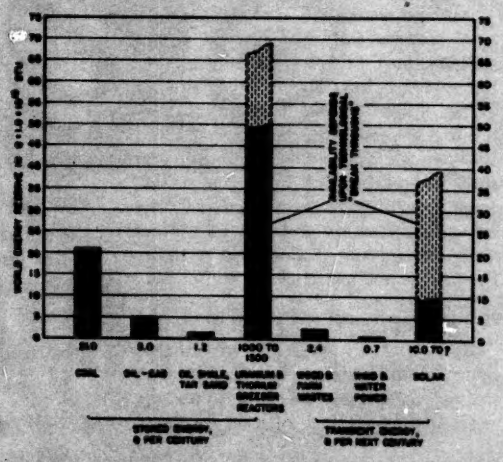


Fig. 1 (left)—An evaluation of probable primary energy consumption in USA for the balance of this century, based on data by Lawrence R. Hafstad in "Uses of Atomic Radiation and Energy" (in The Scientific Monthly, Vol. 84, Nov. 1954).
Fig. 2 (right)—An estimate of stored and transient world energy reserves available at costs no greater than twice current. Present energy consumption is 10 times that of century ago. Figures presented in this graph are based on data from two sources: Palmer Putnam, in Energy Sources of the World by D. Van Mostrand Co.; and, E. Ayres and C. A. Scarlott, in Energy Sources, McGraw-Hill Book Co.

ultimate utilization in large scale is assured.

However, solar energy is the most difficult of our energy sources to adapt directly to useful purposes. One of the most probable near future uses in this country will be in space conditioning. The prime deterrents currently are the capital investment needed in equipment, the development of improved thermal storage systems, and the improvement of solar collection devices.

Heat Pump Achieves Stature

Residential and commercial heat pump systems have emerged from the status of experimental curiosities to that of practical devices. This has come about as a result of the changing relative costs of fuels, and the growing acceptance of comfort air conditioning. In early 1956 there were approximately 8,000 residential and commercial heat pump systems in this country with roughly 45 to 50 per cent of these installed in the gulf states area. Another 20 to 25 per cent were north of the gulf states and south of Chicago, and an additional 20 to 25 per cent in the far western states.

The almost explosive expansion of heat pump installations in the gulf states area is exemplified by the experience of the Florida Power Corporation in the St. Petersburg, Florida vicinity.[1] Here heat pump experiences started in 1946, but by 1951 there were still only some fifty installations. By 1953 this had increased to some 230 installations. However, by 1955 there were well over 900 installations, and this again more than doubled to 2000 by 1956!

Air and water are the two primary heat sources for current heat pump systems and in both residential and commercial installations the use of air as a heat source is now predominant. A typical example of this trend is given in Table I. The anticipated mass adaptation of heat pump systems is partially restricted by the educational needs of those in contact with the buying public and partially by utility acceptance.[2]

Solar Application Problems

Solar heating systems are further away from technical perfection and public acceptance. Such systems are currently hampered by the needs of large capital investments, the problems of the integration of the necessary solar collector designs into the building architecture, and the relative abundance of fossil fuels which still exist on this continent. However, solar energy is capable of supplying all of the heating needs in mild climates possessing reasonable solar availability.

One of the interesting near future possibilities for the utilization of solar energy for space heating appears to be in the adaptation of solar energy as a heat pump-heat source, either partial or total. A summary of a comparative analyses of hypothetical heat pump-solar heat source systems as compared with standard combustion fuel systems is presented in Table II. Such systems were proposed by Jordan[3] in 1948, and complete analyses of solar energy heat pump systems were developed by Jordan and Threlkeld[4,5] for the locations of Madison, Wisconsin; Lincoln, Nebraska; Nashville, Tennessee; and New Orleans, Louisiana. Several architectural designs were developed, and one comprising a living room, garage, three bedrooms, dining room, kitchen and bath was used in the analyses. A single-stage compressor system forming a year-around heat pump air conditioning system with evaporator side heat storage was assumed. Weather Bureau records over a period of twenty years were analyzed to determine the heat storage periods required.

Several technological breakthroughs in the adaptation of solar energy to space conditioning now appear on the horizon. At least one plastic film

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[1] Personal correspondence with Mr. Guy C. Hall and Mr. Karl E. Hickman, Florida Power Corporation.

[2] Brundage, H. M., "A New Look at the Heat Pump Market." Electric space Heating and Heat Pump Conference, New York City. December 1956.

[3] Jordan, R. C. and Priester, G. B., *Refrigeration and Air Conditioning*. Prentice-Hall, Incorporated, 1948.

[4] Threlkeld, J. L. and Jordan, R. C. "Utilization of Solar Energy for House Heating," *Heating, Piping and Air Conditioning*, 26:193-201, January (1954).

[5] Jordan, R. C. and Threlkeld, J. L., "Design and Economics of Solar Energy Heat Pump Systems," *Heating, Piping and Air Conditioning*, 26:122-30, February (1954).

TABLE I. Heat Pump Sysems Classified as to Heat Source (local data compiled by Florida Power Corporation and Georgia Power and Light Company)

Years	Air Source		Water Source	
	Residential	Commercial	Residential	Commercial
1946-1954 Cumulative	29%	7%	71%	93%
1955 only	67%	21%	33%	79%
1956 through June	77%	66%	23%	34%

TABLE II. Summary of Design Conditions and Operating Costs for Heat Pump-Solar Heat Source System

City	Madison	Lincoln	Nashville	New Orleans
Calculated design heat loss, Btu per hr	65,000	62,000	53,000	35,000
Capacity heat pump evaporators, tons	4.2	4.0	3.4	2.3
Flat-plate solar collector area, sq ft	1,210	715	1,010	226
Emergency auxiliary heating system, Btu per hr	31,000	27,000	18,000	8,200
Volumetric heat storage requirement, cu ft	600	460	470	156
Cost of fuel:				
Electricity, cents per kw-hr	1.5	1.6	0.4	2.0
Natural gas, cents per 1000 cu ft	90	50	75	55
Oil, cents per gal	14.2	11.5	13.8	12.0
Average winter heating cost in dollars:				
Gas	162	72	65	15
Oil	199	135	98	27
Heat pump	94	78	19	20

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Fig. 3 (above) Southdale Regional Shopping Center.

Fig. 4 (right)—Southdale heat equipment room. What appears to be gas engine mufflers at top right are actually special heat exchangers also, extracting wasted Btu's for winter heating. (Pictures courtesy Minneapolis Gas Co.)

has been developed which may eventually be cheaper to incorporate than glass and which possesses approximately the same solar transmissivity characteristics. Simplified fabrication methods of incorporating plates with tubing in the construction of collector plates have been developed. Of even greater importance is the development of surface treatments for both copper and aluminum which provide selective emissivities, high for the absorption of solar energy and low for the reradiation of energy from the collector plate. Such developments bring much closer the era of low cost solar energy collection for all purposes, including space conditioning.

Southdale Shopping Center

The mass production of residential heat pump systems presents problems somewhat different from those encountered in very large commercial installations. Commercial and industrial installations warrant the involvement of a high degree of engineering effort and skill which would not be permitted in the mass production of standardized units. If water is to be used as a heat source, a detailed study of the surrounding geology is necessary. The unique combinations of heating demand, air conditioning demand, and energy sources usually must be considered in detail. Such an installation is found in the new Southdale Shopping Center system located outside Minneapolis in Edina, Minnesota.

This is the world's largest heat pump installation and provides year around space conditioning to the largest shopping center located under one roof.[6] Fig. 3 shows an aerial view of Southdale which consists of some sixty-seven retail stores with a total internal area of 675,000 square feet. The central garden court is a twentieth of a mile long and three stories high, space conditioned to provide perpetual spring weather conditions despite the severe Minnesota winters. The trade area population is approximately a quarter of a million, and parking is provided for 5,200 cars plus 1800 cars in overflow.

Initial design investigations indicated that the cost of a standard heating system would be approximately $1,800,000. *Over half a million dollars was saved in initial cost by the use of a heat pump system.* Five sixteen-cylinder reciprocating Refrigerant-12 compressors driven at 1800 rpm by natural gas engines through step-up gear boxes were utilized. The relative inefficiencies of the gas engines over electric motors provide additional waste heat which is conserved by jacketing the gas engines with mufflers. Figure 4 shows the compressors and gas engine prime movers in the equipment room.

All sixty-seven stores are provided with ventilation air by fan-coil units located in the penthouse. One hundred per cent ventilation air is used and cooled in the summer by well water pumped through coils of the fan coil units. In the winter months the ventilation air is heated by hot water supplied to the same coils. The largest store of the group, Dayton's, occupies approximately 195,000 square feet and is cooled by a central chilled water refrigeration-heat pump plant of 700 tons capacity on the cooling cycle. The air conditioning for the remaining tenant stores is provided by packaged units ranging between two and fifteen tons with a total capacity of an additional 700 tons. Ventilation air precooling provides another increment of 600 tons to total 2,000 tons cooling load.

Winter operation requires heat for tempering the outside air introduced to the garden court and for offsetting the transmission losses through the exterior surfaces of the building structure. Heat for these purposes is supplied through the refrigeration compressors operating as heat pumps and supplemented by heat absorbed by the water-jacketed exhaust gas mufflers and gas engines.

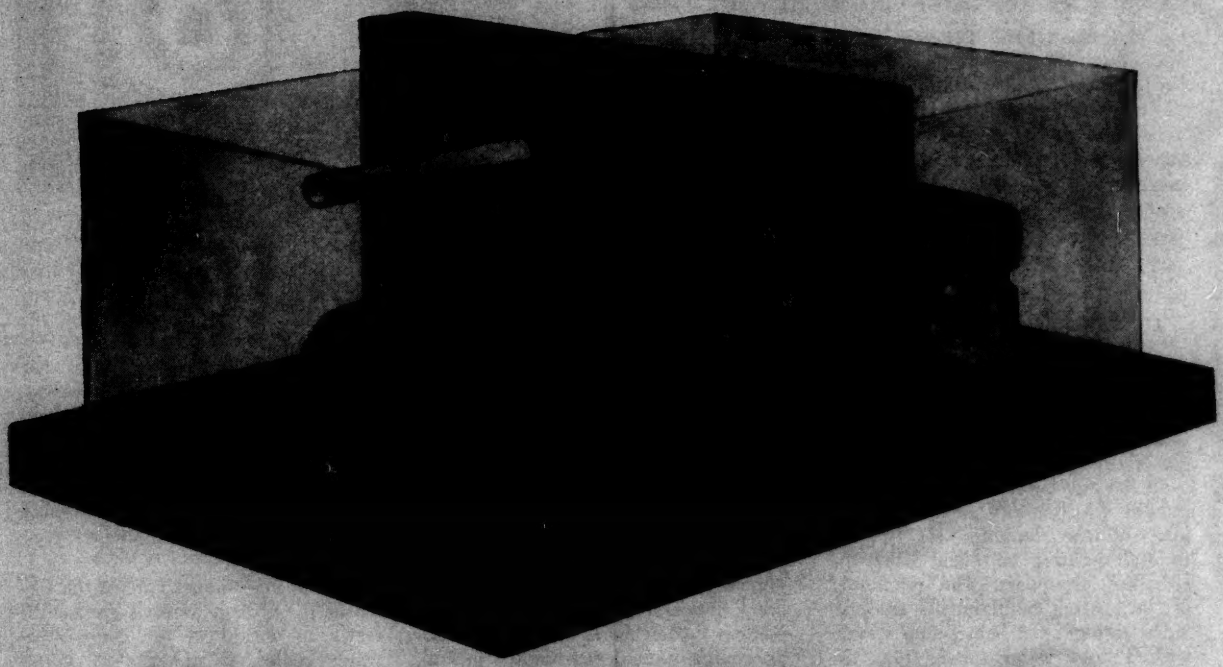
Peculiar Water Strata Furnishes Heat Storage

The system of water supply and rejection is unique. The major source of water supply, the Jordan sandstone, lies approximately 420 feet under the shopping center and a glacial drift filled with sand and gravel provides an underground storage basin approximately 130 feet below the center. Three deep wells were drilled into the Jordan sandstone and one into the glacial drift. Two of the wells into the Jordan provide pumping wells, and the third is used for returning the water to this stratum. The fourth well permits the storage of hot water in the glacial drift during the summer months and the use of this same water during the winter.

The water is taken from the Jordan sandstone at approximately 50 F and is first used for precooling air during the summer. With a 10 F rise this water then passes to the central conditioning system where the water temperature is increased to approximately 75 F. The water is then circulated through the packaged water cooled compressors in the tenant

[6] Etnier, Ralph J., "Gas Heats and Cools World's Largest Shopping Center under One Roof," *The Minnesota Engineer*, Vol. 7, No. 12, Pages 16-19, 24, January (1957).

Rats gnaw right through some insulations . . .



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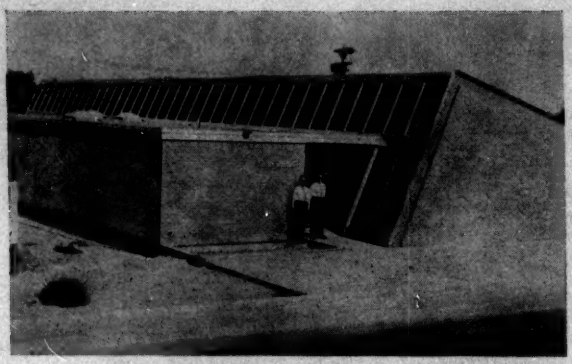

Fig. 5 (above) Solar Building constructed in 1956 at Albuquerque, N. Mex., which is the first completely solar heated office building in USA. Apparent window-panes are actually heat collectors.

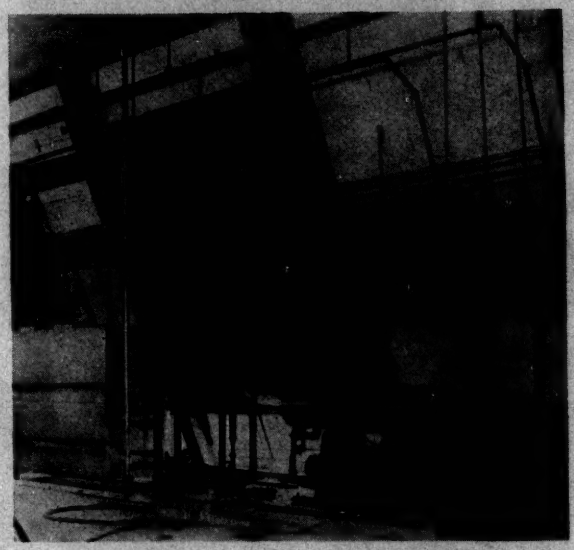

Fig. 6 (right) Collectors pictured in Fig. 5, are backed with inexperience building insulation and panel-finished. Evaporative cooler at left accomplishes storage water cooling in summer as well as being a cooling tower for the heat pump unit pictured at the right.

buildings and is discharged at approximately 90 F. From here it passes to the engine and muffler jackets to be discharged at approximately 110 F through the diffusion well into the glacial drift.

In the day hours during the winter months the majority of the heating load of the building is supplied through lighting and heat from the structure occupants. The remainder of the heating requirements are provided through the heat pump system with supply water taken from the glacial drift. Initially last fall this water was at a 75 F temperature, but since the system had not been in operation a sufficiently long period of time this gradually reduced to 50 F.

A sequential programming system has been designed to provide self-monitoring of all controls automatically. A data handling and reduction system is also planned in order to record automatically pressures, temperatures, and volumes at all control points and to flash a warning to the security office whenever any of the equipment is not operating correctly. The transcriber for the data reduction system will be located in the security office at the basement level.

Solar Heated Building

First completely solar heated office building was opened in 1956 in Albuquerque, New Mexico. Fig. 5 shows a general view of this building with Messrs. Paxton and Bridgers, the owners of the consulting engineering firm which designed and occupies the building. The building itself has a gross area of 4,300 square feet and contains 830 square feet of solar collector surface, providing a ratio of floor area to collector area of slightly over 5 to 1.

The collectors integrated into the design of the building are tilted to an angle of 30 degrees from the vertical and are south facing. Flat plate absorbing surfaces with integral aluminum tubes fabricated by the "roll-bond" process are used, and ordinary window glass faces the collectors. Thermal storage is provided by means of a 6000-gal water tank installed underground. From here cooled or heated water is circulated through a radiant floor and ceiling panel system with both the floor and ceiling surfaces used for heating and the ceiling only for cooling. A view from the rear of the collector panels is shown in Figure 6.

Outdoor air for ventilation is supplied through a central air system with the air tempered in winter and cooled in summer. A 7½-ton refrigeration unit is provided to aid heating in the winter and cooling in the summer. An evaporative water cooler is used both for evaporative cooling of the storage water in the summer months and to serve as a cooling tower for the heat pump when operating on the summer cooling cycle.

There are four phases of system operation, two with the heating cycle and two with the cooling cycle. When heating demands are made upon the system, and when there is sufficient solar availability to provide comparatively high water storage temperatures directly from the solar collectors, hot water is circulated directly from water storage to the panel heating system and the air tempering coil. When solar availability is insufficient to satisfy the heating demands directly, the heat pump is inserted in the cycle with heat absorbed from the water storage tank into the evaporator and boosted by means of the heat pump to sufficiently high temperature to permit space heating. During this part of the cycle the heat pump condenser water is circulated through the heating panels and the air tempering coil.

During the summer months the water in the storage tank is cooled directly by means of the evaporative water cooler. Cool water is stored during the night and the evaporative water cooler continues to operate in the daytime. Chilled water thus obtained is sufficient to provide the majority of the cooling season demands, and in this cycle water is circulated directly from the storage tank through the ceiling panels and the ventilation air coil. When the capacity of the evaporative water chiller is insufficient to provide all the cooling demands, the refrigeration system again enters the cycle. Now, the evaporative water cooler provides condenser water for the refrigeration cycle, and the chilled water thus obtained is circulated through the ceiling panels and the ventilation air coil.

To this date only a portion of a year's experience has been obtained with this combination solar-collector heat-pump system.[7] For the winter

[7] Personal correspondence with Mr. Roger W. Haines, Chief Engineer, Bridgers and Paxton, Albuquerque, New Mexico.

1956-57 the system acceptably passed the test through two weeks of unusually cloudy weather in January. During this time the system worked satisfactorily down to a storage tank temperature of 44 F and with a temperature leaving the heat-pump evaporator coil and entering the collector of 40 F. It was even noted that there was actually some collection of solar heat during one morning of rare but heavy fog.

Experience to this date indicates that the system tends to be self-limiting. Solar collection efficiency increases rapidly as the collection temperature falls, and at high collection temperatures there appears to be a limit of collectibility, at least in cold or cool weather. A maximum collection temperature of 110 F was reached last November. Whenever the storage water temperatures are above approximately 85 F, it has been found possible to heat directly without using the heat pump system.

Frozen Food Convention To Arrange Consultations

ALL wholesale and retail distributors who register for the National Frozen Food Merchandising Convention and Exposition to be held at Chicago September 8-11 will have an opportunity to select one or more of 36 highly successful industry leaders for a personal business consultation. This is a new feature of this fall's gathering under the auspices of the National Frozen Food Distributors Association. Announcement of how this setup will be handled was made by William M. Walsh, Morrison & McCluan, Inc., Pittsburgh, Chairman for the event.

"The new program has been tailored to the needs of wholesalers seeking operational advice from the experts in the industry", Walsh said. "A series of clinic rooms will be used throughout the entire first floor of the Sherman, one level above the Frozen Food Exposition. Group consultations will be held throughout Tuesday morning September 10 from 8:30 a.m. to 12:30 p.m. Appointment cards in addition will permit scheduling individual interviews throughout Tuesday afternoon and all day Wednesday.

"It will be convenient and easy for registered distributors to come to grips with the particular problems that can mean many thousands of dollars of loss or of potential profit back home," said Mr. Walsh. "Learning the other fellow's mistakes and trials in such consultations can often prove the surest short-cut to success."

Passenger Liner To Be Air Conditioned

ONE of the most complete air-conditioning systems ever installed in a passenger ship will be fitted in the popular 35,000-ton Cunard cruise liner Mauretania prior to her departure next winter on her annual series of Sunshine Cruises to the West Indies and South America.

In addition to the 100 percent air-conditioning of the public rooms, every stateroom in the Mauretania will be equipped with regulators which will permit passengers to adjust atmospheric conditions in the stateroom to suit their individual comfort. The system employed in the Mauretania (and the Caronia), unlike many other cruise ships also allows the passenger the choice of opening the stateroom portholes when desired.

Cultivating the Foreign Market for Poultry Products

THIRTEEN months ago an International Trade Development Committee was formed for the poultry industry, representing six national poultry trade organizations. The Institute of American Poultry Industries was authorized to represent the other five groups in signing agreements with the Foreign Agricultural Service of the U. S. Department of Agriculture to handle developmental work in other countries under Public Law 480.

Under this law, importers in other countries use their own currency to pay for the products they buy from us. This currency remains in the country it comes from, to be spent there by U. S. industry on market development in that country. The U. S. exporters are paid in U. S. dollars, out of government funds appropriated under Public Law 480.

The agreement which the Institute has signed with USDA provides the amount of one million dollars equivalent, to conduct market exploration and market development of poultry and eggs in nine countries: West Germany, Italy, France, Austria, Greece, Spain, Columbia, Peru and Chile.

Thus far only West Germany has "signed up" for poultry imports under P.L. 480. This agreement covered $1,200,000 worth of chickens, turkeys and ducks during 1956. Altogether, 3,406,527 pounds of fowl fryers, turkeys and ducks were shipped to Germany last year under this agreement. There were, of course, some problems to overcome —such as the German housewife's preference for a bird with the head and feet on and a rich yellow colored skin; the difference in price per kilo (2.2 pounds) between our ready-to-cook birds and the French dressed poultry they were used to (head and feet left on and viscera ahead of the gizzard left in); the German importer's dislike of our first packaging and our weight variations, they were used to 24 birds to the box with less than an ounce variation.

1957 Prospects

The picture for 1957 has not yet shaped up. The Bureau of the Budget has recommended against any dollar appropriations under P.L. 480 in 1957, for products not owned by Commodity Credit Corporation. This is being protested vigorously and we still hope that U.S. poultry can be exported to West Germany this year, part of which may be paid for in dollars, part in 480 funds.

Following several months of demonstrations and publicity work done by Homer Huntington for the International Trade Development Committee, plans were made to open an office in West Germany. By the end of this month, two employees will be working out of this office on a two-year market development program. During this time we expect to make enough progress with the German retailer and consumer to build a demand for U.S. poultry which will outlive P.L. 480.

Preliminary contacts have been made in Columbia, Spain, France, Italy. Of these, Italy offers the brightest immediate prospects as far as poultry exports are concerned. Of course Canada is still our best export market for poultry, and Cuba, Mexico and Venezuela are currently our best markets for shell eggs.

We must be realistic about the probability of European countries adopting improved mass production techniques and automatic processing and packaging methods. This will tend to sharpen our competition further.

In the meantime, the principal cities have sufficient tourist business and "carriage trade" to afford the quality and convenience U. S. poultry offers. This business should be available for some time. Sound efforts to develop it appear to be worth while.

(Highlights of talk given by Dr. Cliff D. Carpenter, Institute of American Poultry Industries, February 16, 1957, at the Institute of American Poultry Industries' 28th Fact Finding Conference, Kansas City, Missouri)

Practical Refrigeration Engineer

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Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, Inc., an educational association, "not-for-profit".

From the President's Desk

Busman's Holiday for Engineers' Executive; Fall Programs to Emphasize Safety & Training

VACATIONING is doubly enjoyed when a person can do some particular thing which has been a desire for a number of years. The pleasure is even multiplied more when several objectives are achieved. NAPRE's President, therefore, can report satisfaction in having completed several plans of a personal nature. However, the climax came in carrying out an NAPRE assignment which had been a personal desire for almost two years.

On July 12 it was your President's pleasure to attend a meeting of the Sioux City Chapter, NAPRE, when the chapter was presented a charter. Officers were also installed for the coming year. Congratulations of the entire Association goes to the new officers, the chapter founders, and members for their enthusiasm in making this new chapter a young success.

It has been a little less than two years since the first inquiry was received concerning the formation of a chapter. As then vice-President for Chapters, it was your President's good luck to lend a little encouragement to the Iowa Chapter's aims, and to watch them develop slowly but surely as a full-fledged unit in NAPRE.

Promotes Safety as Topic For Chapter Fall Programs

From the chapter reports in this issue of our official organ, chapter officers will readily note that some of the biggest and smallest, some of the newest and oldest units, have already planned their educational programs. (See the Los Angeles and New York City reports, as examples). To those chapters which have not concluded their Fall Calendar, and to those who may have an opening later on, this column would like to recommend *Safety* as a theme or meeting topic.

NAPRE's Industry Relations Chairman, Larry Benedict, has been carrying on practically a one-man fight to make NAPRE more conscious of its responsibility in Safety education. He has learned from many segments of our industry that operating firms have been pleased with our efforts in improving our maintenance and operating educational program. However, we are lacking a bit in our Safety training.

Gus Carstensen, Chairman, NARW's Safety Committee, wrote Larry as follows: "Safety is a never-ending job and if you can sell the engineers on safety, it will go a long ways in furthering the movement. *The engineers have a good frequency rate but their severity rate is far too high.* We have had two engineers killed in California the first six months of this year, which very sadly brings home the necessity of hammering on the wiseness of a good Safety Program."

Educational Committeeman Plugs NAPRE Objectives

Long-time member and educational committeeman C. Tom Baker, Technical Editor of "Refrigeration", and author of numerous papers and texts on power plants and refrigeration, gave NAPRE a good sound plug in the July 22 issue. He was using his prerogative as a granddaddy in this game, to point out losses suffered in production due to poor operation. Here was one remedy which he offered:

"One of the best examples of record having to do with adult training in applied engineering is reflected in the outstanding educational work of the National Association of Practical Refrigerating Engineers, with which the writer has been familiar since the organization was perfected more than 40 years ago. Over the succeeding years, a well-rounded educational program has been carried out, both on the national level and local chapter level, of which the Society may well be proud."

Friend Baker listed in his editorial feature, some 10 things the plant engineer should know . . . Serves all of us as yardstick to measure our engineering stature. His recommendations will be as well taken by NAPRE as the industry to which his comments were directed. Our only regret is that space does not permit listing his 10 points here.

Members will surely excuse their President for using these remaining few lines to thank Vice-President Chase for his pinch-hitting job last month. His message to the Members-at-Large has already brought two inquiries on how to form a chapter.

Bert C. McKenna

Refrigeration capacity increased 25% with no increase in electric power

By installing Carrier Centrifugal Compressors, Schmidt's of Philadelphia utilized existing power reserve of boiler steam to boost their refrigeration capacity without increasing electric power requirements.

Now there's plenty of "beer as beer should be" to meet the increased demand for this popular Philadelphia brew. By adding a steam turbine-driven dual Carrier Centrifugal Compressor to the existing 1320-ton ammonia reciprocating system, C. Schmidt & Sons, Inc., effected an increase of 330 tons of refrigeration with no increase in electric service facilities.

The Carrier installation utilized the existing power reserve of boiler steam. It required ⅓ less space than adding reciprocating refrigerating machines of equivalent capacity. And it was made with minimum modification of the existing system.

This installation highlights the advantages of Carrier Centrifugal Compressors for increasing the capacity of any plant having an investment in an existing ammonia reciprocating system. They provide an economical plant heat balance and automatic adjustment to load conditions.

Whether you need a single machine to boost your present capacity or an entire ammonia refrigerating system, bring your problem to Carrier engineers. Call your nearest Carrier office or write Carrier Corporation, Syracuse, N. Y.

A dual Carrier Centrifugal Compressor, driven by a steam turbine, fits in perfectly with the plant heat balance at C. Schmidt & Sons, Inc. High-pressure boiler steam is utilized first in the steam turbine to drive the refrigeration compressor. Then, with the turbine acting as a reducing valve, low-pressure steam is used for cooking, pasteurizing, bottle washing and plant heat. The power for the Centrifugal, which becomes in effect a by-product of the main steam requirements, is thus obtained at virtually no cost.

Carrier

ammonia refrigerating systems

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Reduce Power, Fuel and Water Costs

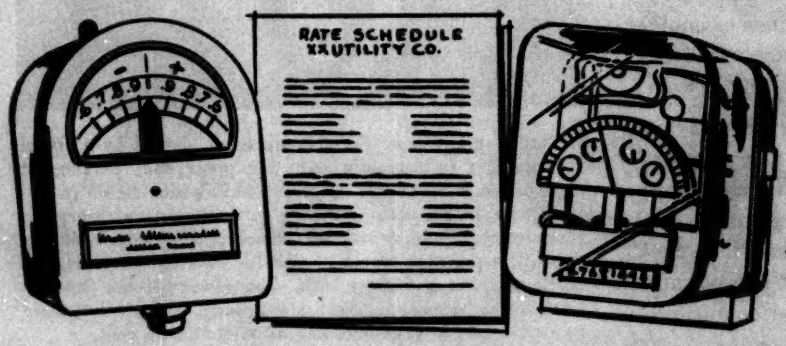
M. E. BELL

National Director, NAPRE

BESIDES thinking up ideas of how to persuade the Boss to give time off and other assistance in getting to the NAPRE national meeting at Chicago, at this time of year the chief and his assistants are probably giving a thought or two toward the annual overhaul. Conclusion of a busy operating summer season in food freezing or storage, ice manufacturing, brewing, and even in air conditioning, prompts some planning for the annual overhauls soon to follow.

Those engineers who follow such planning practices are to be commended and their managements are fortunate in having fore-sighted personnel. However, the engineers in mapping out and clearing an annual inspection and maintenance program with management often overlook another factor: It is proper time now to look over those operating costs, with an eye toward possible reductions before next peak season!

How to reduce operating costs in refrigerating plants is a topic which has caused many societies, publishers, and even owners to expend large sums on paper and ink, and consid-



erable time in preparation of such reader material. And, the various angles to be considered are as numerous as the literature circulated. This year, however, the NAPRE Educational Committee suggests that the chief, his assistants and management give a few additional thoughts to some conservation and cost reductions in power, fuel and water.

This paper, therefore, will be confined to some personal experiences and findings, in such items as:

(1) Electric power schedules, power factor correction, power demand, and power consumption.

(2) Steam and fuel costs for prime mover, and diesel or gas engines for prime movers.

(3) Conservation of water; Treatment of water, stills, etc; Well water vs. "city" water.

Cost of Electric Power

Rate structures for electric power will vary, sometimes as much as 100 percent in different localities in the United States and Canada. Power cost will therefore be dependent upon source of power for electricity generation; such as water, steam, or diesel, and the power transmission distances from the generating plant to the consumer. Heavy concentration of population or industry will also have an influence upon the electric rates. The basic power rates are established by a public authority and the average consumer has very little control over such rates. The consumer can in most localities select the power schedules which may be advantageous to his particular plant, and the power company generally, will offer advice on the most suitable schedule.

Electric power schedules are based upon connected horsepower, maximum demand, power factor, and kilowatt hours consumption. In some plants a "ready to serve" or standby schedule is also available. The load factor of the plant, which determines maximum demand, and power factor should be carefully analyzed to determine the most advantageous schedule. If neither engineering nor management are familiar with rates or schedules, and utility personnel are unfamiliar with the operating problems of the plant or industry, consultants are available[1].

However, selection of more suitable rate schedules is not the cure-all answer. The present classification may be most advantageous. With the present schedule or a new one, another factor is most important.

Close cooperation of the production and operating engineering departments is the most important function in reducing power costs.

Peak loads on the individual items of equipment may be so spaced as to reduce the maximum demand in relation to the kw-hrs consumption. That can result in substantial savings in power costs. A good example is in a brewery where the larger motors for grain conveying and grinding, cooling equipment, refrigerating machinery, etc., may be operated at such intervals that a minimum demand will result.

Power Factor Improvement

Power factor is definitely a consideration in rate scheduling. It may be controlled in the plant to a great extent by the installation of synchronous motor drives, and static condensers (commonly known as capacitors). Synchronous motors are very expensive in the smaller sizes and are effective for P.F. correction only while they are running. Capacitors are relatively inexpensive and are effective all the time they are connected across the circuit.

In some localities the power company objects to capacitors being connected across the main service because most of the electric power is produced by water power and a leading P.F. may result during the

[1] Most power companies have special representatives who are qualified in making recommendations for the owner's guidance. It is advisable to consult the utility representative when selecting a schedule. In most cases his advice will be an assistance in obtaining the most economical power possible.

early morning hours, causing line disturbances in the system. In such cases it is required that the capacitor be connected across the load side of the motor circuit so that it will be effective only while the motor is running. When capacitors are connected to individual motors, the cost is increased to such an extent that synchronous motor drives should be considered.

Power factor meters are now available which have contacts to actuate relays for disconnecting capacitors at 98 percent P.F. and reconnecting them when the line P.F. falls to 95 percent. This automatic control will be an advantage to the consumer in maintaining a high P.F. and also overcome objections to the power company[2].

P.F. Bearing On Rates

A schedule may be selected by a firm which will enforce a penalty of one-tenth of one percent of dollar billing for each percent of P.F. from 70 to 60 percent, and two-tenths of one percent of dollar billing for each one percent of P.F. from 60 to 50 percent. Seldom will the penalty exceed three percent of dollar billing. Conversely, a rebate will be paid consiting of two-tenths of one percent of dollar billing for each percent of P.F. from 80 to 90 percent and one-tenth of one percent of dollar billing for each percent of P.F. from 90 to 100 percent.

It is understood that now other schedules are obtainable in some sections of the country whereby a credit or penalty greater than three percent of dollar billing may be obtained. This schedule is advantageous to the larger plants, but usually the dollar billing in the smaller plants is too low to justify the installation of sufficient P.F. correction equipment to offset the penalty. Even in the larger plants, rarely is it profitable to raise the P.F. above 98 percent.

Demand Advantages

Maximum demands of the plant on electric power supply is still another factor in rate structure. Power schedules may be selected based upon the maximum demand for the five winter months determining the demand for the remaining seven months, or the demand meter cut out during the hours of 1:00 a.m. to 6:00 a.m. Such a schedule may be based upon the maximum demand from October 1 to March 1, and the operating firm will be charged maximum demand for the other seven months.

In Canada where the climate is cold and the winter nights are very long, the demand for electric power from the utility company is much greater than in summer when the nights are very short, so the power company encourages the use of more power in the summer and less in the winter by offering the above schedule. Such a schedule may be advantageous for a brewery as the heavy load is during the summer months in which the lower maximum demand of the winter months will be charged.

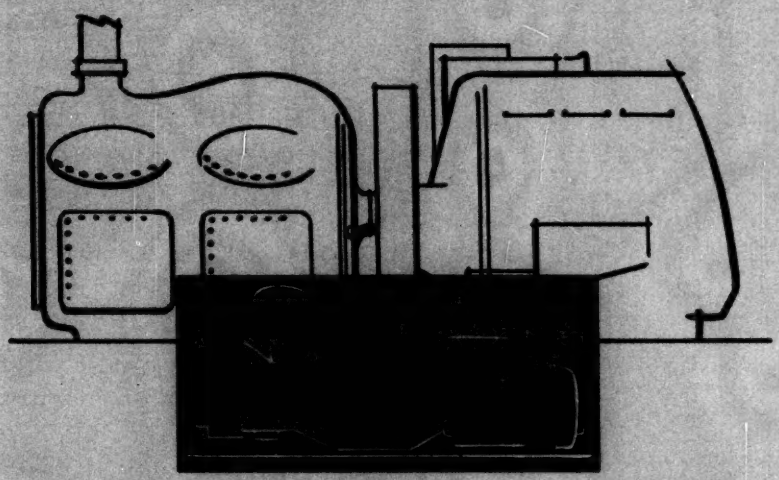
It is suggested that a look be given to such schedules as they would offer a great advantage to some industries which can operate large motors at the off-peak hours. It is also an advantage to the power company to encourage the use of power during the hours when the load is usually the least. Except for cooperation between production and engineering regarding off-peak periods, the total kw-hrs consumed is almost beyond control of the average operator as usually a certain quantity of power is required to produce a certain quantity of product; and, this phase is more the responsibility of the designing engineer.

Voltage Levels Affect Cost

Is it advisable to own transformers and purchase power at primary voltage, or have the power company install this equipment and purchase power at secondary voltage? Power schedules are provided for either of the above conditions, but the plant load should be carefully analyzed before a choice is made. Usually primary purchase is not justified below 300 kw demand. If power is purchased at primary voltage the owner has a considerable capital investment in transformers, foundations, secondary wiring and switchgear into the switchboard, and is responsible for maintenance of such equipment. When power is purchased at secondary voltage the equipment is installed and owned by the power company and the owner has no capital invested. An "investment charge" is paid monthly with the power bill and is written off as operating expense. With the existing tax structure it has been found that in many cases it is to the advantage of smaller plants to purchase at secondary voltage and write off the "investment charge" as operating expense.

Steam, Diesel Power, Or Natural Gas Prime Movers

Electric power in some localities is relatively expensive and other fuels cheap. Such an example will be where fuel gas cost is about 18¢ per 1000 cu. ft. and electric power is about 1.5¢ per kw-hour. Under such circumstances steam prime movers should be considered as competitive with electric motors. Internal combustion engines using natural gas for fuel may also become competitive with electric power, under such circumstances.



Late development of the high-speed W-style reciprocating refrigerant compressor has made the application of steam turbine drive more attractive for breweries. This may also be true of other plants, such as in food processing. The turbine does not require lubrication as in the old reciprocating engine cylinder, so the exhaust steam is not oil-contaminated and may be used for boiler feed water heating, space heating, water heating, or bottling machinery heating. Practically all of the heat from

[2] The author has installed such equipment in some of his plants. Name of the manufacturer and some pertinent plant data available on request.

the steam may be recovered in this manner, and the electric demand greatly reduced because the turbine will be operated during peak load periods.

Efficient boilers will generate steam with fuel gas at above stated costs for approximately 30c per 1000 lbs. A medium size turbine will require approximately 33 lbs. steam per hp hour. Therefore, the turbine may produce approximately 30 hp hours, or 22-1/2 kw-hrs for 30¢ in fuel. The same 22-1/2 kw-hrs of purchased electric power will cost

22.5 kw-hr x $0.015 = $0.3375

compared with same power from turbine at a cost of 30c.

This situation will effect a saving of more than 10 percent and can be justified. The entire plant condition will be improved by the reduction of electric maximum demand. Savings in steam are accomplished when the turbine exhaust is used for various heating purposes. However, if a turbine is selected for driving a compressor, the driver should be of such capacity that it can be operated practically continuously at full speed, as the efficiency of a steam turbine falls off rapidly at reduced speeds.

Turbine Drive Answers Plant Addition Problem

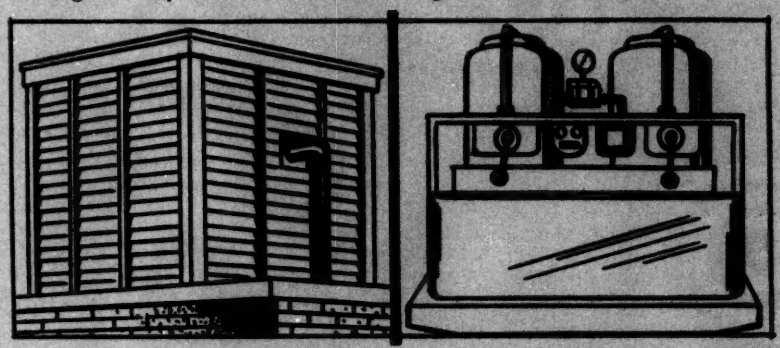
Another good example of turbine drive additions was in a plant which had outgrown the existing electric service capacity, and also required additional refrigerating capacity. The cost for additional transformer, service, and switchgear was estimated at $12,000.00. The additional ammonia compressor required 75 hp to which would have also been added the cost of motor and wiring. Analysis of the steam plant indicated that the boilers were being operated at approximately 60 percent capacity and live steam was being used for feed water heating and space heating.

The installation cost of turbine in this instance was less than the estimated cost of expanding the electric service and the motor. And, the operating conditions of the entire plant were improved. Actually the cost of steam power was approximately 12 percent less than if electricity had been used.

Internal Combustion Drives

Application of natural gas burning Diesel engines[3] is not as attractive as the steam turbine because of the high investment cost and operating difficulties found with internal combustion engines. Diesel or natural gas engines are being used almost exclusively for standby service in case of failure of public power.

In the brewing business, it is generally conceded that only sufficient standby electric generating equipment to protect the plant and the product is necessary. This rule will fit other refrigerating enterprises as well. Therefore, only the vital equipment is connected to the standby unit. Brewery equipment includes an air compressor to supply air for instrument control for boilers and brewing processes, emergency lighting, and the power for completing a brew which has been started. Equipment for processing beer, racking kegs, and bottling beer may be shut down while the main power is interrupted as these phases of the brewery effect the output of the plant but do not vitally effect the quality of the brew.



Small diesel power plants cannot compete with public service except in rare instances. Assuming that a used 100 kva unit costs $12,000.00 installed and is written off at $1200.-00 per year or $100.00 per month and an equal amount is charged against building, fuel storage, and maintenance. Then, the fixed charges against the unit is $20. per month in addition to operating costs. This unit should operate on approximately .6 lbs. fuel per hp hour at variable loads. Assuming 150 hp average, the fuel consumption will be

150 hp x 0.6 lbs/hp-hr = 90 lbs/hr

or 11-1/4 gal. per hr.

This 150 hp should produce about 100 kw. With fuel at 14¢ per gal., plus the lubricating oil, running cost is approximately 1.6¢ per kw-hr. No labor is charged against this standby power because the regular operating engineers will operate the equipment.

Usually larger industrial refrigerating plants are located in such zones that the noise and vibration from the engines do not create a nuisance, but this problem should be investigated before such engines are installed.

Water Conservation

Almost all industrial plants, regardless of their geographical location, are beset with water problems. Northwest USA and Western Canada have problems of conservation and treatment the same as in Southern California, though perhaps they appear in a little different form. They are just as difficult to solve, however.

In Canada where the source of domestic water is usually from rivers and the winter temperatures may fall as low as minus 60 F, water supply becomes a serious problem. Ice may form over the rivers to a thickness of 3 to 4 feet, and of course the pure water will freeze first leaving the most undesirable water to flow under the ice. This condition will also tend to scrub the bottom of the stream, picking up more undesirable matter which will be pumped into the system.

When the rivers thaw, ice packs move down stream and almost everything imaginable from houses to dead animals are carried along. The water after a thaw is always very muddy, contains a great deal of vegetable matter and is much softer than in winter. Extensive filtration and chlorination equipment must be installed to supplement the inadequate public service system. This equipment is not only expensive, but must be protected from the weather by buildings, heating systems, etc. Carbon is being used extensively for water filtration under such conditions.

It has been found that the filter bed will retain some bacteria even after the back wash. The influent water may contain only a small amount of bacteria, but after considerable service, say in about a week's time, the effluent will show much more bacteria than the entering water. This condition indicates that there is considerable bacteria growth in the filter bed, probably aggravated by the fil-

(Continued on page 38)

[3] Replying to a question on what he described as "natural gas burning Diesel engines", the author explained how heads were changed, spark plugs added to two sides, and other minor alterations made to give a highly satisfactory conversion.

Immersion Freezing—Costs And Values

DR. W. J. STADELMAN
Purdue University

IMMERSION freezing has been used rather widely in the fish industry for some time. In the past year considerable interest has developed in using this method to freeze poultry. The principal advantage claimed for immersion freezing is speed plus the resultant improvement in the color of poultry meat, particularly turkeys.

Various mixtures have been tried, with good general results. As early as 1943 Stewart and co-workers reported on the use of a brine spray at minus 5 F. More recently workers at the University of Massachusetts worked with calcium chloride brine in a tank for immersing the birds, to bring about rapid freezing. The use of immersion brine cooling in combination with freezing offers possibilites for connecting into a line operation. As reported at the 1956 Fact Finding Conference, however, we must remember poultry meat must be aged if it is to be tender.

First investigations at Purdue had to do with how different solution temperatures affect the rate of freezing. Frozen at temperatures of 20 to 5 F, some of the birds had previously been cooled at 35 F internal temperature, and some were frozen as soon as they came off the killing line. It was noted temperature made little difference in the birds previously cooled to 35 F. But with the uncooled birds, the lower temperatures very definitely decreased the amount of pink color showing on the surface. One important factor showed up early in the studies: a package that would fit skin tight, was needed to get uniform color. Currently, different solutions and the effects of the rate of brine flow are being studied.

Immersion Freezing Used With Blast Storage Room

GEORGE PINCHIN
Tend-R-Flesh, Inc.

In our present operation we are using an immersion freezing system for initial freezing and a minus 10 blast storage room to finish the freezing. This is highly adaptable to a continuous line operation, whether the birds are Rock Cornish or heavy tom turkeys. It does a much superior job, too, of freezing hot scald poultry, compared with blast freezing. The main sales advantage is the uniform color, regardless of the type or age of poultry.

We realize the weaknesses of both brine and propylene glycol and are still looking for a better solution to use. We use propylene glycol because of the low toxicity—"leakers" can be washed and rebagged. Also, the initial cost of the glycol freezing system is less than a brine operation, as is the equipment upkeep cost. We recognize that our system requires more agitation, to get the same coefficient of heat transfer as brine, but we utilize this agitation for other purposes as well.

A very serious problem is educating the shipper and store manager to handle fast frozen poultry properly so that it retains its color. Too many stores have insufficient freezer counter space and try to merchandise frozen poultry in a high temperature meat counter. Unsold poultry that is moved back into the freezer becomes almost repulsive in color and general appearance.

As for the future, unless we see something better, we will increase the use of liquid freezing as our volume demands.

Highlights of a panel presented February 15, 1957 at the Institute of American Poultry Industries' 28th Fact Finding Conference, Kansas City, Missouri.

(Continued from page 36)

ters being in a warm location and the low velocity of water passing through the bed[4].

Are Wells An Answer?

When conditions as above are encountered, the logical solution to the problem should be wells. Unfortunately, the problem is not so simple, as very little underground water can be found in the Pacific Northwest. Wells up to 700 feet deep have been drilled without obtaining any quantity of water, so water treatment plants must be installed. These adverse conditions are not always found, as in Spokane, Washington, excellent water in ample quantity is obtained at 400 feet depth. This water has a constant temperature of 60 F and does not change in quality throughout the seasons.

Domestic water in Regina, Saskatchewan, is pumped from wells and contains approximately 58 grains per gallon total solids. It is useless to drill individual wells, as the same type of water will be obtained. So, practically all water for industrial purposes must be treated.

Two methods of water softening may be considered; soften with Zeolite, or ion exchange softeners; or distill with steam. One plant is now installing a still for 900 gallons per hour capacity as it is felt that the distilled water quality is constant and in this case was less expensive than the ion exchange method. Water for all other operations such as bottling equipment, keg washing, and general plant usage is treated by Zeolite softening process.

Breweries are becoming more water conscious than a few years ago, because good water at a reasonable cost is a problem in almost all parts of the country. Careful analysis of conditions and accurate reports have been made, resulting in some instances the water-to-beer ratio being reduced from approximately 20 to approximately 13; that is, 13 bbls. of water used for all purposes to one barrel of beer produced.

Other industries which are plagued by such problems as sources and treatment may benefit from application of a few conservation measures. The brewing field has seemingly pioneered in various re-uses of non-process water. New pasteurizing equipment now being installed is equipped with so called "regenerative cooling". This system uses water cooled by the incoming beer bottles or cans (which have a temperature of approximately 40 F.) for the last cooling sprays[5]. The equipment is more expensive but produces a cooler beer from the pasteurizer and saves a great quantity of water. Also, water from the last sprays of the bottle washer is reclaimed for use as makeup in the Pasteurizer cooling circuit.

Before a private well can be evaluated, the water temperature must also be considered. One case came up where a well was drilled and excellent water in sufficient quantity was obtained, but the temperature was 86 F. This project was soon abandoned and domestic water purchased again.

Summary

In conclusion, it seems that no standard can be applied to all plants to determine when and how the best operating economies can be established for electric power, steam and diesel fuel, or water service. Each individual plant must be analyzed and all operating conditions, future expectations, and other problems evaluated before decisions are made. Adequate, accurate records must be kept and constantly reviewed if an efficient plant operation is expected, and above all, the management, the production department, and the engineering department must be economy conscious. As stated in previous articles and discussions, it is the author's opinion that the best piece of equipment in the refrigerating plant is a good engineer.

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[4] Chemical compounds or materials for cleaning carbon filter beds have been perfected. The author has successfully used one product and standardized on it for his several plants. Name of product and firm on request.

[5] Beverages are usually canned or bottled with the product at between 34 to 38 F, hence the 40 F can or bottle temperature. Cooling of cans or bottles is accomplished as they emerge from the Pasteurizer. This water which picks up the Pasteurization heat (150-180 F) is recirculated via a "regenerator" ahead of the Pasteurizer where it gives up its heat to the cooler canned or bottled product, actually slightly preheating the latter prior to Pasteurizing.

Ice Cream Production

ICE cream production in May this year was 61,720,000 gallons according to the Agricultural Marketing Service. This was three percent less than the May output a year ago, but nine percent above the 1951-55 average for the month. Production this May was the fourth largest output on record.

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, California.

Can Rain Soaked Insulation Be Dried Satisfactorily?

QUESTION NO. 1191: What experience have members had with glass fiber type insulations which were rain soaked during construction? What can be done to dry it out? Are any ill effects to be expected?—M.S., Milwaukee

ANSWER: It is noted that your question refers to the glass fiber type of insulation. As a general thought, the fibers are made of glass and are solid and hence, themselves do not absorb moisture. Any water within the insulation form or board is merely held on the surface and drains off the fibers rapidly. Since the fibers themselves are not "wetted", wetting does no damage to the insulation.

Specifically, I have the following suggestions:

If the insulation was on hand and stacked for application to the new construction work, and provided the weather has turned fair with ample sunshine, Iwould suggest that the material be spread out in the thinnest possible layers consistent with the area available. If the area is limited, arrange some planks on sawhorses or scaffolds and tier the material, slanting each level so that as much sunlight can get to the material as possible. Place some large fans for gently applying air over the surface of the material if adequate natural ventilation is not possible. This should allow heavy moisture to drain from the material and evaporate a great portion of any vapor retained in the insulation after drainage.

If the insulating material has been placed, it will be necessary to puncture any retaining material at the lowest possible point in walls and at adequately spaced intervals on the underside of ceiling work. This will permit any water that has been dammed in the insulation to run free. In the event that the so-called "dry-wall" construction has been used, the water should drain rapidly from the material through whatever porous surface used on the cold side.

It is suggested that the supplier of the material be consulted and if necessary the manufacturer's representative be brought to the site and the manu-

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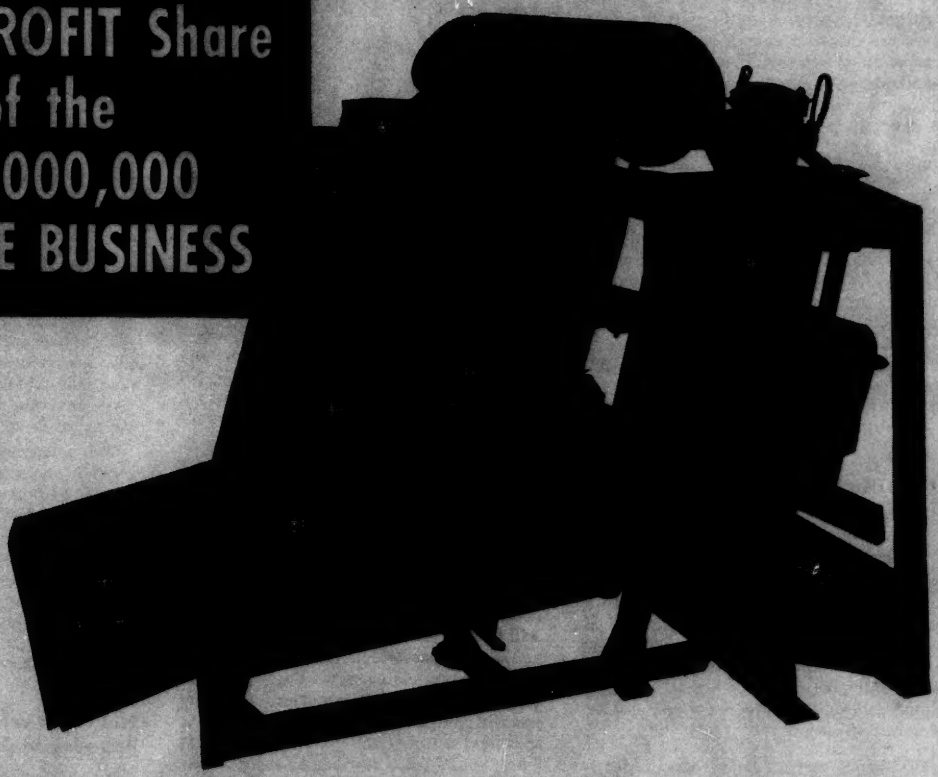

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facturer's recommendations obtained. In all probability the manufacturer will recommend that any entrained vapor which has neither drained nor evaporated be pulled from the insulation by lowering the temperature within the refrigerated area. Plan to pull the temperature down in your room several days earlier than you would on completion of construction. As the moisture would form on your refrigeration coils, defrost it and keep up this cycling until no further rapid frosting is apparent. You will probably have pulled the greater portion of any entrained vapor from the insulation by that time.

If the soaking happened in a floor area which could not be readily drained, I am afraid that you would probably lose a great portion of the insulation laid on a sub-floor as it would be extremely difficult to remove the water while the insulation is in place. Evaporation of moisture out of such an area is always difficult unless the insulation can be adequately drained.—J.R.K., Chgo.

Does Buried Insulated Pipe Get Special External Cover?

QUESTION NO. 1192: What is the proper method of laying an insulated ammonia line underground for a distance of about 150 feet? Should it be laid in a cement lined trench? What is the best type of insulation, and is any special preparation of it involved that wouldn't be necessary if in the open air?—J.J.B., Member-at-Large

ANSWER: As in so many problems, the decision on how to lay the line has a cost factor in it. How much are you willing to pay for long life of the installation? Personally, I would make it a point to shield the insulated line from contact with the ground. One obvious way is to use a concrete trench in which the concrete and air serve as a protection to the line. Another way is to cover the line with about an inch of tar and to cover the tar with sheet metal. There are several systems of prefabricated underground service sold as such by suppliers. Anything short of fairly thorough protection from contact with the soil would, in my opinion, be a mistake.—H. P. Hayes.

Enthalpy Definition Request

QUESTION NO. 1193: Can anyone give us an understandable definition of the term "Constant Enthalpy" as is found on the Mollier Chart?—C.S., Spokane, Wash.

(Editor's Note: Neither space nor time permit publication here of a chart on NH_3 properties. Such a chart is generally a folded affair placed in a pocket inside the back cover of text books. NAPRE members and IR readers who possess *Basic Refrigeration* by Guy R. King, can use chart No. 1 in the back of their text. Those who use *Refrigeration Theory & Practice* by the late Prof. H. G. Venemann, can refer to chart No. 2 in the inside back cover pocket of that book.)

ANSWER: Enthalpy is a term which describes the heat energy content of a gas or liquid. For example, saturated ammonia liquid at 100 psi absolute has an enthalpy of 105 Btu/lb.

However, there are many other conditions at which ammonia has the same enthalpy. For example, at 20 psia, a mixture which consists of 14% gas and 86% liquid also has an enthalpy of 105 Btu/lb. The best way to picture a constant enthalpy line, therefore, is to picture it as showing all of the possible conditions under which the ammonia will have a given enthalpy.

The process which takes place across an expansion valve is a good practical illustration. It is a constant enthalpy process. Suppose the liquid enters as a saturated liquid at 100 psia and expands to 20 psia. Starting at the saturated liquid line at 100 psia (enthalpy is 105 Btu/lb.), follow the constant enthalpy line to 20 psia to learn the state of the ammonia leaving the expansion valve. The chart shows that 14% of the liquid flashed into gas. (The latter value is read on the *constant quality* curve.) As the constant enthalpy line is traced vertically down the chart, one could tell the state of the mixture at 80 psia, 60 psia, etc. as well.—H. P. Hayes.

Seeks Fouling Cause In Force-Feed Lubricator

QUESTION NO. 1194: In a McCord force feed lubricator with glycerine sight glasses on our ammonia compressors, I have trouble with the formation of a sticky substance in the sight glasses and oil lines. It ranges in consistency from jelly to hard gum, and in color from brown to black. It will plug oil lines shutting off lubrication. I use 98 percent pure glycerine and have checked oil supplies for water content with no results. What is this substance and how may it be curtailed?—C.P. Bakersfield.

ANSWER: I do not know what the exact composition of the sludge compound is. As I analyze the problem, there could be two causes for the sludge.

(1) Air with accompanying moisture may have leaked into the system. Generally the combination of oil, moisture, and temperature will result in sludge formation.[1]

(2) There may be some incompatibility between the oil and the glycerine which results in an undesirable reaction. This is not very likely but is at least a remote possibility.

Some engineers have cured this trouble by replacing oil line check valves on the compressor cylinder walls. Blowback through the check valves would bring ammonia, glycerine, oil, and probably water together in a combination which could result in sludge formation.—H. P. Hayes.

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[1] See *Basic Refrigeration*, Chapt. 3, p. 52.

Harvest Cycle Upsets Auto-Ice-Maker Functions

QUESTION NO. 1195: I have an ice machine, package unit, one ton per 24 hours. In the cycling process it loses its gas and oil out of the compressor. When it drops its ice by the use of the hot gas, the gas does not return to the compressor and will also lose what gas is in the receiver and condenser which are all built in one unit. All solenoids have been tapped with a hammer to check for sticks but that doesn't help. After two or three pump downs the gas and oil will come back and work perfectly for a while. Then the trouble starts all over again. Can you give me any suggestions on how to cure this trouble?—C.W., Tulsa, Okla.

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2615 Twelfth St., Detroit 16, Mich.

ANSWER: In answering this question, it is presumed that the refrigerant is Refrigerant-12 and that the word "gas" means refrigerant and that by the statement "will also lose what gas is in the receiver and condenser . . ." means what *liquid refrigerant* is in the condenser and receiver.

The losing of crankcase oil is no doubt due to excessive dilution of crankcase oil with refrigerant. This dilution is almost invariably caused by improper action of the expansion valve. If the superheat setting of the expansion valve is too low, the separation of oil and refrigerant is less complete than with a suitable superheat setting. Hence, the lubricating oil will be returned to the crankcase in a more dilute condition.

Erratic action of the expansion valve will also cause excessive oil dilution. Such action of the expansion valve may be due to sticking, improper placement of the bulb, poor contact of the bulb with the suction line, an oversized port, or too much lubricating oil in the refrigeration system.

My guess is that "too much lubricating oil in the system" is at least a part of your trouble. The hot gas with its entrained oil condenses in the evaporator during the dropping process. If there is excessive oil in the evaporator when normal freezing is resumed, there will be a refrigerant-oil stream passing the thermostatic bulb of the expansion valve which will be at the evaporator temperature and will cause the thermostatic valve to stay closed; thus, causing the system to pump down.

If "too much oil in the system" is the main cause of the difficulty, I suggest the installation of a discharge line oil separator and removal of oil until the proper crankcase level is achieved. —N.S., San Luis Obispo, Calif.

Do High-Side Pressure Terms Mean Same Thing?

QUESTION NO. 1196: Is it correct to use the terms head pressure, discharge pressure and condensing pressure as all meaning the same thing?—J.B.S., Green Bay.

ANSWER: Strictly speaking, there will be slight differences among head pressure, discharge pressure, and condensing pressure. The difference came from pressure drop (loss in pressure due to friction opposing the flow of gas). For practical purposes, the three are approximately the same.—H. P. Hayes.

New Questions

Challenges Corrosive Label For Refrigeration Grade NH3

QUESTION NO. 1197: Last year I noticed an advertisement in a national trade paper where an engineer was quoted as describing the refrigerant as being corrosive anhydrous ammonia. I have always been under the impression that ammonia contained in a refrigerant system was anything but corrosive. At least I have never heard of an ammonia system corroding from the interior. Would someone care to straighten me out on this matter?—C.T., Chicago.

Air Purification, Oxygen Replacement in Submersibles

QUESTION NO. 1198: The following questions are in regards to the air conditioning in atomic-powered submarines: (a) How is the air purified, or filtered, so that they may remain underwater for indefinite periods? (b) Can this type of equipment be made, or modified, or utilized in any way so that it may be economically practical in stationary equipment in buildings such as hospitals, hotels, stores? (c) Is the heat of the foul air lost in the process? If not it certainly would be a fuel saver, particularly if it should ever reach the stage where it could be used in the average home.—L.O.G., New York City.

Cryotron Definition Asked

QUESTION NO. 1199: Some months ago you explained a transistor and we note that the Detroit Chapter had a speaker on the topic. Can you do as well for us on describing the cryotron? —N.M.D., Chicago.

Notes Use of K Expression— Asks Comparative Definition

QUESTION NO. 1200: In many trade papers recently in connection with temperature there has been an expression K used instead of C or F to indicate the degrees of temperature. What does the K mean? How does it compare with C and F?—A.D.L., Member-at-Large.

Seeks Condenser Hook-up In Adding Water-Saver to Plant

QUESTION NO. 1201: We have a cold storage plant with approximately 400 tons of refrigeration and are using the vertical type shell and tube condenser with well water of approximately 60°. We are contemplating adding 100 ton of refrigeration that must be connected with the existing compressor. Since we are now pumping all the water we feel is available in this area, we plan on using some sort of an evaporative type condenser. Since each engineer has a different opinion on how to connect an evaporative type condenser with a shell and tube condenser in the same system, we would appreciate your answering the following questions:

Can an evaporative type condenser be installed between the shell and tube condenser and the compressor, and discharge the gas into the top header of the shell and tube unit which would simply remove the super heat?

The other hook-up would be to connect the condenser with the discharge side of the compressor with the outlet hooked into the receiver with some sort of a trap between the evaporative condenser and the receiver.

We will appreciate any comments you might have on these two hook-ups which you think feasible.—L.A.W., Kansas.

(Continued on page 42)

New Concept In Interior Wall Finish

for

Low Temperature Rooms, Coolers and Freezers

Swift's ADCOTE

Adhesive Finish

While Adcote was developed for use on insulation in low temperature freezer and cooler rooms, tests have indicated it is also a superior finish for concrete, brick and dry wall construction. Contractors who have used it have been particularly pleased with the ten advantages Adcote provides:

1. GOOD COLOR STABILITY
2. EASE OF APPLICATION
3. HIGH STRENGTH
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Swift

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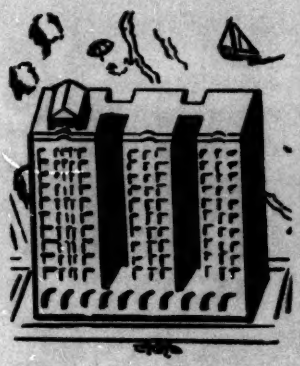
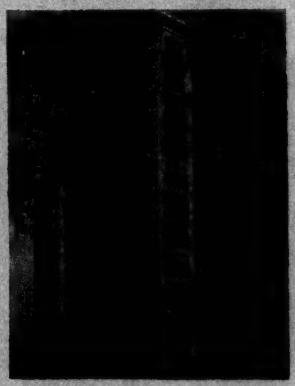
Chicago Moves Ahead With 48th Meeting Preparations





NAPRE's 48th Annual Meeting to be held in Chicago November 18-21 will locate delegates and informal activities at the Sherry hotel (left). Exhibits, meetings, more delegates, speakers and guests will be headquartered at the Del Prado (right). One featured tour only a few blocks from the scene is to the Chicago Museum of Science & Industry. Full scale mining, TV development, telephone communications, networks, and other industrial displays are housed in this technical center.

FIFTEEN percent more display space than ever before will be taken by exhibitors and Industrial Members, to show NAPRE members the latest developments in the air conditioning and refrigeration field. Many suppliers will be demonstrating their products at the 10th Exposition of the Industry in Chicago's International Amphitheatre, in addition to displays at NAPRE headquarters. About 300 exhibitors will participate, occupying over 100,000 square feet of floor space at the Amphitheatre to reach dealers, contractors and distributors of packaged, domestic and commercial equipment, whereas NAPRE's Industrial Members and Exhibitors will be fewer and use their space allotments to reach industrial users. However, NAPRE National Convention programs have been scheduled in the mornings only to leave the remainder of the day open for visitation at the All Industry show or to plants in the area which will be open to NAPRE members.

Educational sessions for the members will feature such speakers as Guy R. King. His topic will be a more detailed discussion of Chapter 13 of the Basic Refrigeration textbook, concerning food freezing techniques. The use of air cooling for meat plants will be the informative subject given by Vice-President and Chief Engineer D. D. Wile of Recold Corp., Los Angeles.

Water conservation, industrial insulation of piping and pressure vessels, and ammonia recirculation are other topics that will appear on the program. Prof. W. F. Stoecker, University of Illinois, is billed as the speaker on multi-staging of larger low temperature refrigerating systems. Fruit Growers Express Co. will have its mechanically refrigerated railroad car FGEX-1600, literally a classroom on wheels, spotted across from the hotels. Classroom sessions and tours can be arranged.

Unusual Engineering Application Featured

One of the most unusual applications in refrigeration, a centrifugal compression system for ice making, may prove to be one of the interesting subjects of the convention. R. F. McKee, Mechanical Engineer, Pacific Fruit Express has eliminated insulation under the brine tanks, does not use covers over the ice cans, uses Sodium Chloride brine rather than Calcium Chloride, and has Refrigerant-12 in the four independent plant systems. Other mass handling features of the product will be of interest in addition to the centrifugal aspects.

South Side Headquarters

Delegates, members and guests will be staying at the Sherry and Del Prado Hotels located on Chicago's Lake Shore Drive. Convenient transportation is available to the downtown shopping and entertainment districts, as well as to the All Industry Show at the Amphitheatre and the plant sites. The south side location is desirable also from the standpoint of ample parking space along the less crowded South Shore.

Since 1940 the most popular visitors' site in Chicago has been the Museum of Science and Industry. This magnificent building is host to some three million visitors each year. There is no other place in the world which specializes in the industrial exhibits found in this museum. To the refrigeration engineer the displays give an insight to the complicated mechanisms of other industries, the Sciences and the Universe. This spectacular building is within walking distance of the Sherry and Del Prado Hotels. Visitors for the Chicago meeting will certainly wish to spend some time there.

New Questions

(Continued from page 41)

Detecting Refrigerant Leaks

QUESTION NO. 1202: Is there any practical means of detecting loss of halocarbon refrigerants (during the early phases of such leakage) in refrigeration equipment generally used for frozen food cases and meat chilling rooms in large food markets?—R.G.J., Chico, Calif.

Portable Vacuum Cooler

LAST Fall a portable vacuum cooler made its appearance at the Cedarville Co-op, Cedarville, New Jersey. It was used in handling the Fall lettuce deal. Widely scattered producing areas of the East have prevented Eastern growers from putting money into expensive stationery installations like those of California. This portable cooler was designed to overcome this disadvantage.—NAII Ice News.

News Notes and Chapter Activities

Greater New York Unit Works Committee of Ten

JERSEY CITY—As readers may have noticed by the newspapers, the New York area had a "scorcher", weatherwise, early the week of July 22. A different type of incident, not so newsworthy, but carrying nearly as much energy from the standpoint of enthusiasm, was the July 24 meeting of the Committee of Ten" for the formation of a Greater New York NAPRE chapter. There have been some doubts that this area would support an active chapter, but it seems sure that present efforts cannot go unrewarded.

The committee met at the Exchange Tavern for a short social and dinner meeting and adjourned to the offices of the Ideal Electric & Manufacturing Co. at 30 Church St. Plans for future action call for group activity in preparing letters to be sent to prospective members and management. These letters and the mailing list were completed in time for the next committee meeting held on August 21.

Fall Program

Under outline of Fall program, New York's committee of ten (which consists of equal numbers of members from New Jersey) has scheduled the following Fall program:

September 11, organizational meeting. Advantages and opportunities to be obtained through NAPRE membership will be pointed out at this meeting. This will be a kick-off of a membership drive. Speaker for the evening will be a well known manufacturer of refrigeration equipment.

September 25, a similar meeting to that of the September 11 kick-off will take place. Another speaker on a topic of interest to all refrigerating engineers will be presented as the second half of the program.

October 9, will start the Guy R. King "Basic Refrigeration" course. It is expected that all new members will have their text books by this date and our instructor will be ready to proceed with the first chapter.

October 23, another chapter in the lecture course and an outside speaker.

November 13, further study in Basic Refrigeration and some pointers on the American Standard "Safety Code for Mechanical Refrigeration." This should be interesting for all and especially helpful for any who are planning to take a license examination.

November 27, this would be a very logical date to make a plant visit to a turkey processing firm, it being Thanksgiving Eve. In all likelihood there will be no meeting on that date.

New Member Accepted

An application for associate membership was accepted from James H. Harris, Jr., Vice-president-Sales, Clark Door Company. The committee of ten has already informed the chapter's new member that they expect him to come up with some inside information on the design, operation and maintenance of the automatic refrigerator doors that the Clark Door Company is building and selling in the dairy, cold storage and other refrigerating enterprises.

One of the "senior" members of NAPRE who reported for his committee assignment at the July and August meetings was Gus Beinert. A few moments of time were given to Gus to describe his new job with the Standard Vacuum Oil Co. at Harrison (Westchester County) N. Y. Beinert described a new centrifugal water chiller application for air conditioning in the office building.

Host for the July meeting was Robert McCreary, manager of the New York office of Ideal Electric & Manufacturing Co. Although there were principally just committeemen present, the group took advantage of the opportunity and McCreary's good nature to obtain some service information on their motor prob-

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More rapid freezing and engineered distribution of turbulent frigid air throughout the system assures you maximum retention of product quality. Losses through "drying out," dessication and bacterial activity are prevented by proper sizing of units. In addition, King systems give you increased cold room capacity, continuous operation with no defrosting shut downs, lower power and maintenance costs. Whatever the type or size of your plant, a King system can be designed for your specific freezing needs by our experienced engineers.

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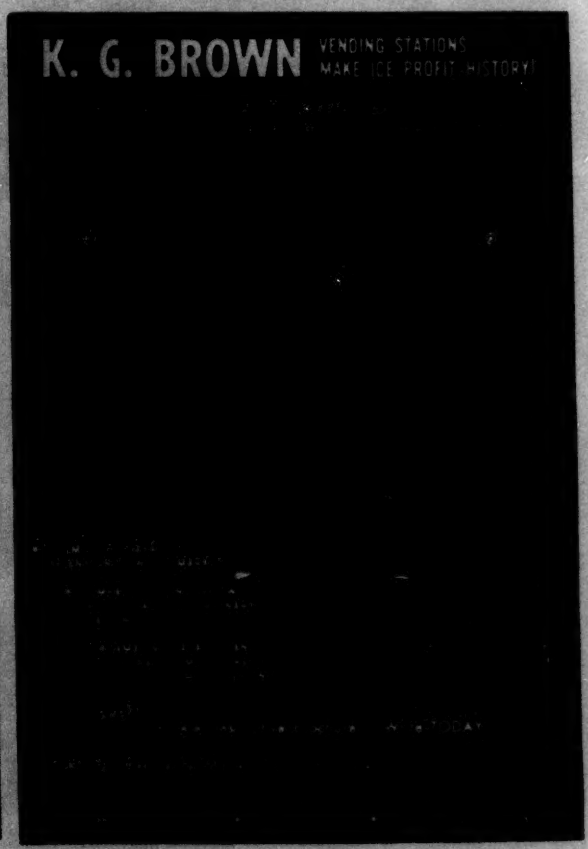

lems. The host distributed a booklet "Mystery of Synchronous Motors and Controls Unveiled." The special pamphlet had been edited and approved as reference material to Chapter 12 of Basic Refrigeration, which endorsement, members were quick to note.

In a letter circulated to prospects in the New York area, Quaid Minich, chairman protem of the organizing committee, invited all Eastern engineers to become charter members of the new chapter. In his message Minich reminded engineers that many of them would give much to NAPRE, as well as receive from the association. He cited the educational features, opportunities for plant tours and the fact that they would be able to rely on, not only specialists and experts in the industrial refrigeration field, but be able to draw on accumulative experiences of all NAPRE members. He invited the engineers to contact him at his work and arrange for attendance at the September 11 meeting. He listed his phone number as Rector 2-2165 from New York, or Oldfield 3-0280 from New Jersey.—QUAID MINICH.

Kansas Goes Underground

KANSAS CITY—Greater Kansas City Chapter, NAPRE, literally went underground at its May 21 meeting. The occasion was a plant visit to Inland Cold Storage Company, located in a well-known limestone cave near Kansas City, Kansas.

The meeting was held in the cafeteria of the cold storage plant. Ladies were invited for the tour. They were given a talk on the history and operation of the Inland enterprises while the gentlemen listened to a lecture by Fred Ladewig of Trane Company. Ladewig's talk was on "Successful Refrigerant Piping". He substantiated his presentation by means of slide films.

Following the meeting, ladies and gentlemen joined for a tour of the plant which was conducted by Bob Clark, Inland's chief engineer. Following the tour pie and coffee was served in the cafeteria. The frozen pies furnished through courtesy of Inland Cold Storage were prepared by Mesdames Clark, Hale and Kenagy.—JOHN MULLER.

Los Angeles Chapter Member Qualifies for M-A-L Status

DETROIT — Change-of-address notification to NAPRE Headquarters from Flavil C. Register, prompted the Publications Chairman to dig out of the files an interesting report on this Los Angeles chapter member. With due apologies to Fred Herr, the L. A. correspondent, this column appropriated the copy and duly inducted Register into the ranks of Membership-at-Large.

At least in the get-up in which he is pictured, he should be a member-at-large. As a matter of fact, NAPRE's Publications Chairman held Herr's copy this long to make certain Register was safely home in USA before our Arabian friends recognize him. He was afraid that this good traveling brother would be hung by his thumbs to the nearest low temperature suction line if they (the Arabs) ever caught up with him in his impersonating attire.

Some of the difficulties he encountered with inexperienced native labor, with the language barrier proving an added handicap, were described in a letter to members of Los Angeles Chapter, NAPRE, by Flavil C. Register, who at present is supervising air conditioning systems in Saudi Arabia for the Fluor Corp. of Los Angeles.

This imposing looking Arabian "Sheik" is Flavil C. Register, member Los Angeles Chapter, NAPRE, who at present is directing air conditioning installations in Dhahran, Saudi Arabia for Fluor Corp.

Register, to whom, of course, the logical nick-name of "Cash" is applied, was active in foreign construction of air conditioning and dehumidification systems in various South Pacific islands from 1945 to 1955, when he represented another Los Angeles air conditioning firm. For the past year he has been stationed in the Near East for Fluor Corp. and had his headquarters in Dhahran, Saudi Arabia.

Training Arab Operators Hair-Losing Assignment

Register is seldom able to attend more than one Los Angeles NAPRE meeting a year, and that is usually when he returns home on a month's leave in mid-summer. However, he keeps in touch with chapter activities through INDUSTRIAL REFRIGERATION, which, he says, he received regularly, though a bit late; and, through correspondence with Ed. L. Nelson and other members of Los Angeles Chapter.

On refrigeration and air conditioning problems in Saudi Arabia and his trials and tribulations with the natives whom he is trying to inculcate with refrigeration know-how, he wrote: "These young

Distilled Water? No . . . DISTILEX

Distilex renders raw water the same as distilled water for ice making, and increases tonnage production by decreasing the number of hours required to freeze untreated water.

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THE CSCO STABLEIZER MAINTAINS GOOD BRINE by a positive reaction to either over-acidity or over-alkalinity!

The CSCO STABLEIZER removes destructive material from the brine without adding harmful chemicals. Easily installed in all systems. No other brine treatment compares in safety. The STABLEIZER helps keep brine safe for workmen's hands . . . protects and preserves expensive equipment!

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Saudi Arabs I'm training to become refrigeration fitters and mechanics, are developing into competent installation applicators and welders. Their inherent manipulative skills, their indigenous enthusiasm and pride of accomplishment, ranks them as high as any foreign nationals with whom I've worked.

"To say it was a rocky road at first, here in Saudi Arabia, is putting it mildly. It was chaotic, organized confusion, and just plain slow work. These young natives couldn't speak or understand a word of English, nor I a word of their language. Our conversations must have sounded like a flock of sputtering magpies playing 'cross questions and crooked answers'. The language barrier seems insurmountable and with that handicap and others, it took a long time to get going properly.

"Out on the scorching jobsites, where oases and even mirages are non-existant, in 120 F sunshine, the blistering, sandblasting Shamals—not to mention the world's most tenacious flies and the huge clouds of desert locusts—I'd find myself gesticulating ambidextrously with hands full of hair I could ill afford to spare, and expressing myself forcefully with what might be called non-technical American words! But we stuck to it like band-aids, and now I do believe we have got it licked."—Roy T. Burns.

Summer Activities Keep Los Angeles Member Interest

LOS ANGELES—No business, no technical discussion and no shop-talk was the policy invoked by President Victor A. Stubblefield as Los Angeles NAPRE Chapter members gathered in the Terminal Club the night of June 19 for the annual "Old Timers Night" program. Fun and relaxation arranged by Ed. L. Nelson's entertainment committee included a social hour during which a professional pianist enlivened proceedings by furnishing the musical accompaniment to barber shop quartetting by various member groups; a swiss steak dinner; introduction of old-timers; and, a floor show, followed by a sports film.

Old-timers were introduced by master-of-ceremonies W. R. Burnett. To rank as an "old-timer" and get a seat at the table of honor, a member had to have at least 15 years continuous membership in the NAPRE. Qualifying for this honor were Burnett (1925), Herbert N. Royden (1925), Furman "Mike" O'Hara (1926), William H. Brittin (1926), Ed. L. Nelson (1928), Donald H. Byl (1928), R. L. Maple (1931), Robert H. Shaw (1937), Ralph E. Hitchcock (1937), Ralph M. Moore (1938), Joseph F. Granger (1942) and Stubblefield (1942). The old-timers were introduced individually by Burnett, who recounted the career of each.

Among the Chapter's 369 members, 49 have been on the roll for 15 or more years. This number includes some members. Among the 30-year men are Burnett, Royden, O'Hara, Brittin, William Losch (1921), Loren M. Anderson (1928), Howard R. Benson, (1926), Frank Elliott (1925), W. T. Finnigan (1926), Frank G. Hooper (1926), Paul Lebshov (1923), E. T. Quinn (1925); and B. F. "Ice House Ben" Duncan of Baker Engineering, who first joined NAPRE in 1911, and was reinstated at Los Angeles in 1951.

Los Angeles Chapter holds no meetings during July and August, although some members manage to get together during the summer on deep-sea fishing trips arranged by Commodore Rudi F. Kettler. One such trip was taken on the chartered fishing boat Sabre on August 19. The chapter's fall program is scheduled to get underway with a ham-and-beans dinner at the Terminal Club on the night of September 18.

Charts Fall Program

The technical program for October, November and December has been scheduled as follows:

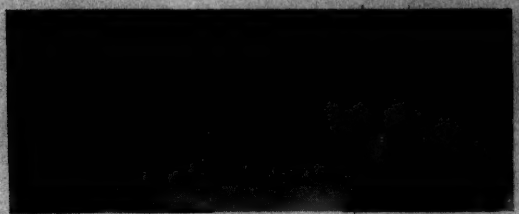
October 2—Nuclear Radiation—Its Effect on the Refrigeration Industry; arranged by Regis Gubser and George Paulick.

October 16—Insulation Forum; arranged by Larry Benedict.

November 6—Plant Visit to Safeway's Lucerne Dairy; arranged by David Nurse.

November 20—Engineering Digest; arranged by Frank Muzzy.

December 4—Election of Officers.



Left: Some of the members with 15 or more years membership in NAPRE seated at a table of honor at Los Angeles Chapter's "Old Timer's Night" included, left to right, Ed. L. Nelson, William H. Brittin, Ralph M. Moore, Robert Shaw, R. L. Maple, and President Victor A. Stubblefield. Right: Audience at Old Timers Night, June 19, Terminal Club. The shirt-sleeve attire was dictated by the 101 F temperature which prevailed in Los Angeles that night. Like the "shoemaker's son", refrigerating engineers are last to get comfort cooling.

Promotes Industry Archives

A proposal that the chapter sponsor a refrigeration museum was submitted for consideration at the May 15 meeting. The suggestion came from Larry Benedict who revealed that the idea occurred to him after inspecting an interesting display of antiquated air conditioning and cooling devices at the Recold Corp. exhibit at the Western Air Conditioning Industries Association exhibit held the week previous in the Shrine Auditorium.

Chapter and national committeemen pose for the Los Angeles Social: L. to r., Ed. L. Nelson, entertainment chairman; W. R. Burnett, co-chairman, membership drive; V. A. Stubblefield, president; W. H. Brittin, past president; Donald H. Byl, secretary. Kneeling George Paulick, national membership chairman; L. H. Benedict, chairman national industry relations committee; and Hal Jarvis, chairman, Los Angeles industrial membership committee.

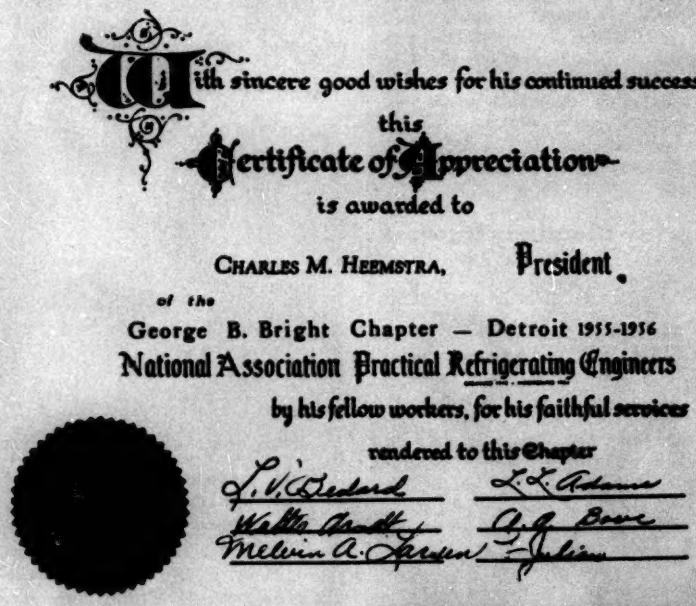
Benedict submitted that there were probably a number of old time refrigeration pieces gathering dust in ice plants and warehouses in various parts of the city. He suggested that such items be tracked down and donated to the proposed NAPRE museum. The collection would be used to good purpose, Benedict said, for display at public events in which the NAPRE participates, such as conventions, conferences, and other gatherings. Each item would bear a metal plate with the contributor's name. President Stubblefield referred the proposal to a committee which will report at a future meeting.

The May 15 meeting speaker was Charles W. Chidester, sales engineer C & S Equipment Company, Los Angeles. He discussed the application of suction pressure regulators to refrigeration systems. The talk was chiefly in the form of explanatory comment for a series of slides illustrating various types of suction regulators and valves.

Los Angeles Chapter's 1957 Program and Membership Index was distributed to the members in mid-May. The handy, pocket-size booklet of 54 pages lists all Los Angeles members (369 at press time) and Colton Chapter members (28), along with each member's address, company affiliation, and home and business telephone numbers. The forepart

of the booklet contains a list of Los Angeles Chapter officers and directors, and the educational program for the entire year from January 2 to December 4. This latter feature is regarded favorably by the membership as it permits them to make advance plans to attend chapter meetings which present speakers scheduled on subjects in which they may have a special interest.—FRED HERR.

Michigan Past Presidents Honored at Banquet


With sincere good wishes for his continued success
this
Certificate of Appreciation
is awarded to
CHARLES M. HEEMSTRA, President
of the
George B. Bright Chapter — Detroit 1955-1956
National Association Practical Refrigerating Engineers
by his fellow workers, for his faithful services
rendered to this Chapter
L. V. Bedard
L. L. Adams
Melvin A. Larsen
T. Julian

Facsimile of Certificate of Appreciation awarded 13 past presidents still active at Detroit in the Geo. B. Bright Chapter, NAPRE. Two widows of past-presidents were also on hand, and similarily honored on June 20. The Bright Chapter is successor to Michigan Chapter No. 1, haivng been renamed this year in honor of the late Geo. B. Bright, Chapter benefactor.

DETROIT—Big mid-year event of the George B. Bright Chapter was the June 20 Reception and Banquet to honor all the chapter past presidents. Setting for the occasion was the Silver Crown Ball Room in a small suburb adjoining Detroit, where a country style chicken dinner with all the trimmings was served to the members and their families and friends, in the splendor of a perfect summer evening and rural surroundings. Chapter members acted as hosts to the living past presidents and their wives as well as the widows of deceased presidents who came in the role of invited honored guests for the event. The Ball Room was filled to capacity and resplendent with the harmony of good-fellowship.

Leonard V. Bedard, who is currently president, acted as Master of Ceremonies and presented to each living Past President and the widow of each deceased Past President an award in the form of a Certificate of Appreciation showing the year the past president served (or years), and a special past President NAPRE emblem lapel button for faithful services to the chapter. The certificate presented is pictured below. Past presidents who were honored are:

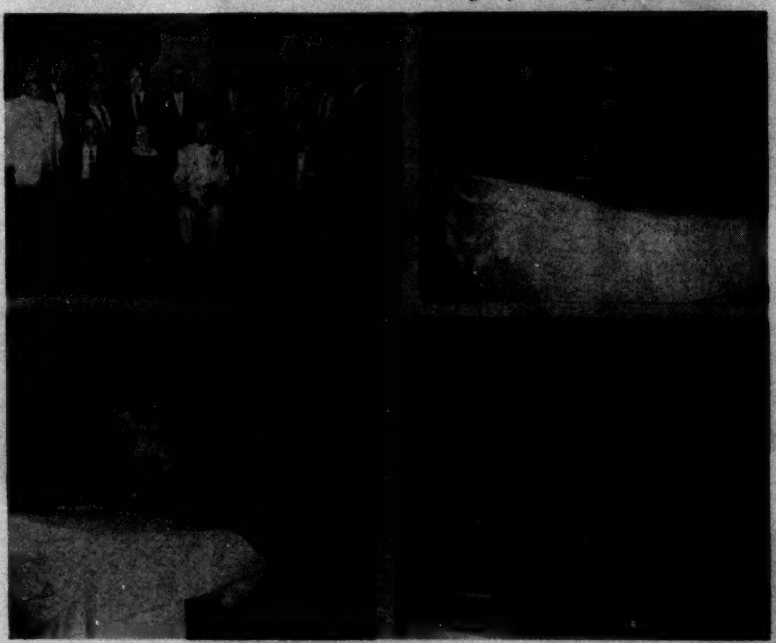
Charles Chapman*	1926
William F. Eberlein	1928 & 1941
Theodore F. Huetteman*	1936
Arthur O. Smith	1940
Burt C. White	1942
Frederick Studer	1943
Joseph Van Loocke	1944
William G. Euth	1945
Joseph F. Wiethoff	1947
Leo C. Gage	1948
Erskine L. Sheffer	1950
Charles J. Purdie, Jr.	1951
Boyd Kitts	1952
Roy T. Burns	1953 & 1954
Charles M. Heemstra	1955 & 1956

*(Deceased — presented to his widow)

The various past presidents were asked to give a few words pertaining to their particular administration. Invariably, their response was that "you get out of any organization whatever you put into it". However, in their particular case, they felt they got a lot more. It was their general opinion, that the colleges build up the students with a lot of technical and useful data, but there is still something missing. They believed that the training received in NAPRE supplied the missing link.

NAPRE Training Viewed As Equivalent Plant Experience

This is accomplished in general discussions to bring out questionable points or the solving of refrigeration problems within group meetings by members com-



In the picture panel, starting at top, left: Past Presidents and widows of past presidents who were on hand to receive Certificates of Appreciation and Past President Lapel Pins were: standing, l. to r. William G. Euth, Boyd Kitts, Charles J. Purdie, Jr., Joseph F. Wiethoff, Erskine L. Sheffer, Burt C. White, Charles M. Heemstra, Frederick A. Studer, William F. Eberlein; seated: Arthur O. Smith, Mrs. Theodore F. Huetteman, Leonard V. Bedard (current president who acted as master of ceremonies), Mrs. Charles Chapman, Leo C. Gage, Roy T. Burns. William F. Eberlein, Charter member and president two terms, 1928 and 1941, receives certificate from Bedard, at top right. In lower panels, Bedard presents certificates to Mrs. Theodore Huetteman, Mrs. Charles Chapman.

prising practical refrigerating engineers, designing and consulting engineers in this field, as well as the members connected with allied industries, all having long experience. The viewpoints and ultimate solving of the problems bring forth information that sometimes cannot be found elsewhere, or just can't be purchased. Theory is brought out in the discussions and alligned with practical experience. The members are primarily interested in the educational program and it is the advice they can get on their problems (plus the good fellowship of the organization) that makes them so enthusiastic.

Moving Picture Presented

After the awarding of certificates a most interesting sound-color motion picture was presented through the courtesy of The Northwest Orient Airlines, who were represented by P. D. Field. The title was "Hawaiian Hospitality", which gave one the feeling that he was 'on the spot' enjoying a wonderful vacation in Hawaii, visiting the various localities of interest, and feasted by the natives with their incomparable knack of hospitality and friendship. The balance of the evening was devoted to dancing, to the music of a very fine orchestra, with some of the old-timers taking the opportunity to reminisce over old times and being introduced to new members recently coming into the fold. —L. L. Adams.

Instructors Rotate Duties at Rio Grande Valley

PHARR, TEXAS—Spectacular would not describe any report from this end of the nation. Rio Grande Valley chapter is still plugging along obstinately, refusing to become completely discouraged by the slow pick up from our drought woes and the reduction it brought in our chapter through plant cut backs and membership relocation. With the changes came the loss of more experienced instructors.

Last year Armin F. Doneis pinch-hit as substitute instructor and managed somehow to conduct the study lessons without too many embarrassing lapses. This year it was suggested that Armin carry on as secretary and the chapter would pass the "professorship" around to the various members, each to choose his topic and manner of approach.

So far Angus Casberg and Olen Fisher have lead study sessions. Casberg discussed Power Factor, and the why and wherefore of PF clauses in power contracts. He also covered means of PF correction such as static condensers and synchronous converters, giving a few highlights of his own struggle with the problem and eventual solution. Olen Fisher gave a brief review of the fundamentals of refrigeration for the benefit of several newcomers. He used Moss' analogy of a dump-truck carrying a load of heat through the various elements of the refrigerating cycle, illustrating the compressor as an elevator to raise the dump-truck to a higher level of temperature to allow flow of heat to the cooling water.

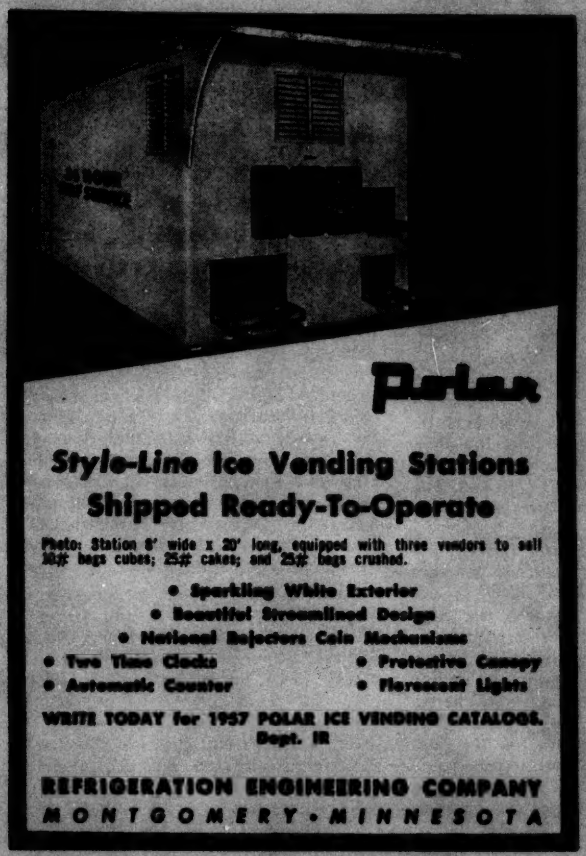
Armin Doneis and family attended the National Congress of the Esperanto League of North America in New York from July 3 through 7th. From there they drove west to Wisconsin to a little "hide-out" in the wilds northwest of Minocqua. Rio Grande Valley members understand they went native, and enjoyed some of nature's home-made cool forests up there.—Barney Majesky.

Yakima Instructor Passes

YAKIMA—Northwest NAPRE members were grieved at the passing of Harry Lester Dodsworth, engineer for the Yakima Valley Memorial Hospital. Dodsworth passed away on July 1, following an extended illness. He was a native of Yakima and lived his entire life there.

Harry Dodsworth had his start in the refrigeration game under the leadership of Lyman Bunting of the Yakima Artificial Ice Company. According to reports from Yakima he was not only a loyal and faithful employee but also a very zealous worker in NAPRE. He served as the chapter instructor for a number of years.

When national president Leroy Etzel visited Yakima in 1956, it was Harry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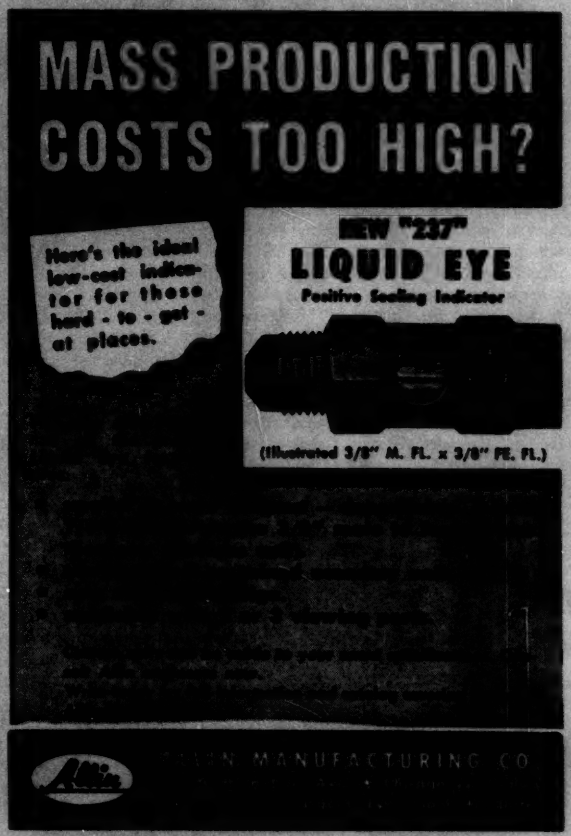
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Dodsworth who made the arrangements for the chapter meeting in the banquet room at the Yakima Valley Memorial Hospital. Dodsworth was first chief engineer at the Yakima Valley Memorial Hospital, lighting off the plant when the hospital opened on April 10, 1950 and worked up to February 27, 1957, when he took sick leave. Dodsworth is survived by his widow, Ruth, a daughter, Mrs. Marilyn Trout, two brothers and three sisters.

Yakima chapter has changed its meeting night. Starting with the mid-year meeting in July the chapter will meet hereafter on the 4th Wednesday of each month at 7:30 p.m. The meeting place is the United Marketers Room of the Holtzinger Building.—Elmer Troop.

Algae Problems in Mid-South

MEMPHIS—Plants in the Mid-South which were equipped with cooling towers are having considerable trouble with algae. Most all plants use the regular treatment right along, but according to most engineers who attended the July 3 meeting of Tennessee Chapter No. 1, the algae seems to recover from the treatment. A certain immunity seems to be built up by this fungus after so many treatments. Practice hereabouts is to change the treatment. That, combined with a partial draining and refilling with fresh water, is termed around the area as a "shock" treatment. It appears to be effective for a short period of time and then the cycle must be repeated.

This general round table discussion by the members seemed to be the principal refrigerating problem of the month. Air conditioning plants seem to be the ones experiencing most of the difficulty. All apparently are being taxed to their limit in order to provide the comfort cooling required by the hot, humid weather. The only business discussions taken up at the meeting were arrangements for the 1957 annual watermelon party.

Platt New President

Douglas M. Platt was elected as president of Tennessee Chapter No. 1, when J. H. Robinson resigned to go to his new position in Champaign, Ill. Platt was chief engineer of the Hotel Claridge, but about the time he became president of the Chapter he became chief engineer of the City of Memphis Hospitals, which is quite a job. The City of Memphis Hospitals provide services free to those who cannot pay. The hospitals are tied in with the University of Tennessee Medical College, said to be one of the best in the world.

The City of Memphis Hospitals consists of the John Gaston Hospital, a general hospital, E. H. Crump Hospital for the colored, Frank Tobey Hospital for children, Gailor Memorial Hospital for mental patients, Jefferson Pavilion Maternity and Isolation Hospitals. There are a number of other hospitals that are in this latter medical center, such as Cancer Research, Tuberculosis, Polio, and Rheumatic Fever.

Platt had formerly been an engineer for the Hospitals before he went to the Claridge as chief. He now returns to the Hospitals with a title of Chief Engineer but his duties more or less involve supervision of all plants. John H. Robinson was chief engineer of the West Tennessee TB Hospital when he resigned as president of Tennessee Chapter No. 1 to take the Humko job. His assistant W. A. Taylor was advanced to the position of chief engineer of that hospital.—Chas. Conley

Chapter Grows Fast — Elections In Mississippi

JACKSON—Summer heat and vacation sidelights did not detract from the interests of Mississippi NAPRE members in the vicinity of Jackson. A meeting of Mississippi Chapter No. 1 was called to order in the Heidelberg Hotel with temporary chairman Fred Greiner, presiding on July 23. This was the meeting previously decided upon for the election of permanent officers. Since it was the first such election, the chair entertained and received a motion that the first committee chairmen also be elected rather than appointed. Nominations were then opened.

Two members were nominated for each position of president, vice-president and sergeant-at-arms, while three members were each nominated for the membership and by-laws committee chairs. The nominations for secretary-treasurer, educational chairman and coordinator of the diversified activities committees were unopposed. Ballots were then taken up by the tellers, Eugene Harper and Harold Armstrong. The ballots disclosed the following parties elected for the first time to office in Mississippi Chapter No. 1:

President, A. G. Liss, Refrigerator Instructor, Hinds Jr. College; Vice-president, Fred Greiner, Chief Engineer, Swift & Company; Secretary-Treasurer, J. R. Thompson, Operating Engineer, Swift & Co.; Sergeant-at-Arms, D. G. Sanders, Operating Engineer, Swift & Co., and Educational Chairman, Charles Warwick. The committee chairmen are Charlie Williams, Membership; Ray Benton, By-Laws, and Harold Armstrong, Coordinator of Diversified Activities. The president instructed the committee chairman as to their duties.

The date for the charter presentation was not set at this meeting but the committee on diversified activities will look into the possibility of a late September or early October date. Previous organizational meetings of the chapter were held on June 25 and July 9. For the purpose of determining who charter members would be the organizational committee set a deadline of the first July meeting. All members accepted prior to that date will hereafter be known as the charter members of the chapter. —J. R. Thompson.

Colton Corrects Errors

SAN BERNARDINO—SNAFU—"Situation normal, all fouled up"—should have been the title of the presentation by C. H. Purkiss at the meeting of California Chapter No. 5, Colton, on June 12. Purkiss presented the slides previously given at the NAPRE clinic on May 7 at the Western Air Conditioning Industries Association Conference and Exhibit. For that clinic, Ed. L. Nelson, of California Chapter No. 2, who represented NAPRE on the conference board of directors, and several other members of the Los Angeles Chapter, presented a series of slides showing improper refrigeration installations. Improper and unsafe operating practices, were also featured.

Purkiss went through the same presentation at the Colton meeting, presenting the slides and asking for comments from the audience on "what's wrong with this picture?" This sort of presentation proved very lively as well as interesting and informative. Everyone was busy figuring out what was wrong with each installation. Sometimes it was the wrong size piping. In others it was the wrong connections. Temperature valves were in the wrong position. Often an engineer was caught in an unsafe habit. A great deal was gained from this type of presentation.

Prior to Purkiss' appearance, Frank Elliot of Union Ice Company, San Bernardino, presented a short discussion on the air conditioning of several ice plant offices. This presentation had been given before other southern California chapters and employed the movement of air over water ice, the principal product being offered by the establishment. Elliot used a blackboard to diagram the system and showed certain features of construction. Lunch closed this dual feature meeting.—H. O. Bonter.

New Pennsylvania Unit Doubles Membership

LANCASTER—Review of the membership situation in the Southeastern Pennsylvania Chapter, NAPRE, at the June 26 meeting disclosed that the chapter had doubled in membership since the same date in March. Although we started with two handfuls by actual count, it does give the chapter the feeling of accomplishment to be able to state that it has increased its membership 100 percent. It is our hope to increase it by 400 percent before the Fall charter presentation.

Schick, Inc., located in Lancaster in 1955. Their plant was the scene of the second meeting in June, and, of course, a tour was in order. J. H. Bullock, plant superintendent, conducted the tour which proved to be very interesting and enlightening. Step by Step, members and guests of the chapter learned about each precision operation which goes into the manufacturing of an electric shaver. To say the least, Superintendent Bullock knows his elec-

tric shavers and everyone who made the tour completed their inspection trip with a feeling that he had instructed them well.

At the conclusion of the tour, all visitors were treated to Danish pastry and coffee in the company cafeteria following which the party adjourned to the conference room. A discussion of the operations previously observed took place and Mr. Bullock and his staff answered a number of questions presented. In the conference room the tourists had an opportunity to inspect every model Schick shaver manufactured since the very original developed by the firm. The original shaver, incidentally had a long flexible shaft extending from a more or less stationary motor to the portable shaver head. Comparison of that model with today's pocket types which can be plugged even into automobile cigar lighter receptacle, brought home to the members the vast improvement made in a relatively short period of years.—ODELL DRAKE.

Louisiana Chapter Signs First Woman Member

NEW ORLEANS—Women members in NAPRE could be counted on the fingers of a single hand until July 24 when Louisiana Chapter No. 2 signed (Mrs.) Olivia P. Burkey as a member of the chapter. New member Burkey, general manager and chief chemist for Chemical Solvent Company, Birmingham, Ala., happened to be the guest speaker of the Dixie Chapter on that date. Her subject was "Water Problems in Air Conditioning Equipment".

Past national president and secretary of the New Orleans Chapter, Leo J. Vivien congratulates Mrs. Olivia P. Burkey on her presentation at the Dixie Chapter in July. Program chairman John Funel introduced the lady visitor, now a member of NAPRE.

Mrs. Burkey's presentation dealt with water from the moment the rain fell. She pointed out to the members that water is such a practical and commonly used item that many engineers failed to recognize that it is the greatest natural solvent and cleaner known to mankind. She discussed various forms of water and its geological sources. The discussion also dealt with sample analysis and the shortcomings to be encountered in this method of determining water treatment.

Mechanical Cleaning Aids

Visual aids were used by the speaker to illustrate several methods of cleaning various heat exchanger surfaces in refrigerating and air conditioning systems. In one figure was pictured the cleaning of a condenser coil in the evaporative condenser. A small electric motor-driven rig is used for spraying cleaning material on the stubborn areas. Other slide figures showed how to clean shell and tube condensers and condenser-receivers on smaller equipment, by means of circulating the cleaner through the exchanger by means of a pump.

The speaker cited *four factors to be considered in selecting an economical and effective cleaning material.* The first consideration, according to Mrs. Burkey, is *safety.* The second is the *corrosiveness* of material, the third, its *ease of handling* and application, and fourth, *evaporation.* After citing these factors the speaker went on to point out that the consideration o fthe principle on which the cleaner works is very important also. A total cleaning procedure was outlined for those in attendance and a preventive maintenance program was also discussed.

Other Refrigeration Talks

Program chairman, John Funel, in introducing Mrs. Burkey, pointed out that she not only is a member of ASRE and RSES, he also credited her with recognition in the field of chemistry, cited her military background in the U. S. Navy Waves, during World War II, and established the fact that her paper presented before the chapter had been

Among the unusually large number of members who attended the July meeting of Louisiana Chapter No. 2, NAPRE, was Harry Kelly, who is now the oldest member of the chapter, one of the few charter members still active.

previously given at regional meetings of RSES. (The paper has been previously published in the June 1957 issue of REFRIGERATION SERVICE AND CONTRACTING magazine. Copies can be obtained from NAPRE headquarters or Nickerson & Collins Co.). This outstanding July meeting was held at Watkins Broadview Restaurant with one of the largest summer attendances yet recorded. Refreshments of cold cuts and cold beverages followed the meeting.—James Chaisson.

Valves and Regulators Other Meeting Topics

NEW ORLEANS—Guest speaker for June 26 meeting of Louisiana Chapter No. 2, was a guest in the very sense of the word. He was Raymond W. Bee, mechanical engineer with A-P Controls Corp. of Nashville, Tenn. The meeting was held at Watkins Broadview restaurant and was sponsored by the Standard Brass & Manufacturing Co. of New Orleans, the local distributor of A-P Controls.

A film was presented which showed the latest developments in thermostatic expansion, solenoid and water regulator valves. Speaker Bee provided the commentary and answered the questions put to him in the Question Box session which followed. John Funel, chapter educational chairman, arranged the meeting which was followed by the usual lunch and refreshments that hits the spot on a hot summer evening.

Complete Systems by Stokes

The air-conditioned Roosevelt Hotel was the scene of the July 10 meeting. Instructor Tom Stokes of the Gary Gamble Company lectured on Chapter 25 of Basic Refrigeration by Guy R. King. The title of this chapter from our official refrigeration text is "Complete Systems". Stokes, a design engineer of Gamble's consulting firm, presented additional information on the various systems outlined in the King text.

On May 22, National Maritime Day, the chapter members missed an opportunity to honor a good many of our refrigerating engineers who gained their practical experiences at sea. Nevertheless our program was an outstanding one. Frank Vaughn, Sporlan Valve Company, was the guest speaker and presented a slide and commentary on shooting trouble on refrigerant control equipment. The meeting was held at the Watkins Broadview restaurant, and arrangements were made through the Mechanical Supply Company and Acme Refrigeration Company, Sporlan representatives in Dixie.

Harold Meighan Passes

Louisiana Chapter No. 2 lost another member in the death of Harold S. Meighan who passed away on Saturday, July 6. A native of New Orleans, he attended public schools here and served as secretary of the Seamen's Town House. He was a member of the Propeller Club of New Orleans, NAPRE, and NAPE. He is survived by his widow, Gertrude, two daughters, a sister and two grandchildren.—JAMES CHAISSON.

Largest Midwest Factory To Be Air Conditioned

TELETYPE Corporation, a subsidiary of Western Electric Company, is constructing a new factory in Skokie, Illinois, which is to be entirely air conditioned. Trane Company has received the order to provide the refrigerating, air handling and heating equipment. It is believed that this will be the largest completely air conditioned industrial project in the entire Midwest. Trane President C. D. Minard revealed that his firm is to provide 2500 tons of cooling through two giant CenTraVac machines. About 650,000 cfm air will be introduced to the system through 14 giant Trane fans. Eight other fans will be exhausting air.

The single story building will provide almost 600,000 square feet of comfort cooled working space for employees. The air conditioning system has been designed for 2,500 employees. By maintaining constant temperature and reducing dust, the system is also expected to provide ideal conditions for precision manufacture, and will help insure dust-free teletype machine products.

A high pressure air handling system will be used to reduce air distribution cost. Velocities up to 3,500 cfm (about 30 miles an hour) will be achieved while air pressure reducing valves near the outlets will control both sound and drafts. Conditioned air is distributed through small ducts with such a system, resulting in a space saving.

System Operation

Chilled water from the CenTraVacs will be circulated to 81 Trane six-row coil banks. Recirculated air will be moved through the chilled coil sections, lowering temperature, reducing humidity and filtering out air-borne dust particles. Cooled air will be sped under high pressure via small ducts to strategically located diffusing outlets where it will be distributed uniformly over all work areas.

The system is designed to maintain 75 F, 50 percent relative humidity conditions with outside temperature at 95 F. Use of air conditioning also affected the design of the building, making minimum window space. Equipment is expected to be moved into the building near the end of August. It will be shipped from La-Crosse, Wisconsin, factories via open railroad flat cars.

Staphylococcus Poisoning

DURING the past six months, more progress has been made than in any similar period in the 10-year life of the project on Staphylococcus food poisoning, according to Dr. G. M. Dack, Director. With a highly purified preparation of the enterotoxin and a pharmalogical test procedure, it seems likely that a simple assay procedure for detection of the poison will be developed soon, which is a most significant development.

At a meeting of the Industry Committee on this project at the University of Chicago, May 20, Dr. Dack reviewed outbreaks of staphylococcus food poisoning reported by Public Health Service during the past six months. Over 20 outbreaks were reported involving about 1500 people. Many prepared foods were involved, such as dressing, salad, sandwich filling, croquettes, cream pie, packaged dinners, sauces, puddings and gravies. L. E. Clifcorn, chairman of the Industry Committee, remarks most aptly in his transmittal of the report that "The value of the 10 years of persistent scientific effort, when reduced to practical applications, is outside the realm of figures."

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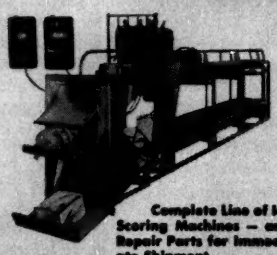

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California Consumers Advances Officers

THE Board of Directors of California Consumers Corporation announces the election of Edward D. Sims as president and general manager of the corporation, succeeding Roy M. Hagen who was made chairman of the Board. Mr. Sims has been an employee of the company for over 30 years and has taken an active part in the management of all departmental operations. For many years he has been vice-president and assistant general manager and for the past several years has held the office of Executive Vice-President of the company and President of its subsidiary Los Angeles Cold Storage Company. The Board of Directors, also announced the election of Jacques Freidin, vice-president and director, as executive vice-president and assistant general manager, and the election of Douglas S. Jardine vice-president, to a director of the corporation.

COMING CONVENTIONS

FLORIDA ICE ASSOCIATION
October 6-8, 1957
Roosevelt Hotel, Jacksonville, Fla.
Muriel Washburn, Exec. Secy.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS
October 17-19, 1957
Grand Pacific Hotel, Bismarck, N.D.

NATIONAL SAFETY CONGRESS AND EXPOSITION
Sessions on Industrial Safety
October 21-25, 1957
Conrad Hilton and LaSalle Hotels, Chicago, Ill.
R. L. Forney, General Secretary

SOUTHWESTERN ICE MANUFACTURERS ASSOCIATION
Conference of Engineers
October 23-24, 1957
Gunter Hotel, San Antonio, Texas
P. A. Weatherred, General Counsel

NATIONAL ASSOCIATION OF ICE INDUSTRIES
November 12-15, 1957
Statler Hotel, Detroit, Mich.
Wm. T. Jobe, Exec. Vice-pres.

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS
November 14-16, 1957
Shoreland Hotel, Chicago
R. C. Cross, Executive Secretary, New York City

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 18-21, 1957
Hotels Del Prado & Sherry, Chicago
J. R. Kelahan, Secretary

AIR CONDITIONING & REFRIGERATION EXPOSITION
November 18-21, 1957
International Amphitheatre, Chicago, Ill.
George Mills, Show Director

SOUTHWESTERN ICE MANUFACTURERS ASSOCIATION
December 1-3, 1957
Stephen F. Austin Hotel, Austin, Texas
P. A. Weatherred, General Counsel

DELTA STATES ICE ASSOCIATION
December 8-10, 1957
The New Montelone, New Orleans, La.
Edna Vaughan, Secretary.

Performance of Rail Cars Transporting Frozen Food

DIFFERENCES in the refrigerating capacities of mechanically refrigerated railroad cars cause wide variations in the time needed to precool the cars before shipping frozen foods in them, according to a report issued by the U. S. Department of Agriculture.

Packaged frozen corn was shipped in two types of mechanically refrigerated cars and one standard water-ice and salt refrigerated car from Waseca, Minn., to Jersey City, N. J., in tests conducted by the Marketing Research Division of USDA's Agricultural Marketing Service. One of the cars with mechanical refrigeration required about seven hours and the other 16 hours to reduce the temperatures to 0 F. No precooling test was made on the car cooled by ice and salt.

During loading the temperature of the corn shipped in the ice and salt car increased from 0 F. to an average of 14.6 F, the marketing researchers found. The refrigerating system absorbed only a little of the heat gained during loading, and at destination the average temperature of the corn in the ice and salt car was 14.3 F. Temperatures in both mechanical cars were below 0 F upon arrival at destination, indicating that the refrigeration systems had ample capacity and were capable of maintaining temperatures, the marketing researchers say.

Costs of fuel for the mechanically refrigerated car with twin engines, which operated intermittently and used 123.5 gallons of fuel, were estimated at $19.76. Costs of fuel for the car with a single engine, which ran continuously and used 97.4 gallons of fuel, were estimated at $15.58. At railroad tariff rates, the charges for the 17 tons of ice and five tons of salt used in the ice and salt car would have been $215.97. Actual costs to the railroads are not known, and other operating costs were not studied. The research work on which this report was based is part of a board program of marketing research aimed at improving marketing efficiency and expanding the market for farm products.

Environmental Field Grows; Safety Emphasized

LOW Temperature refrigerators and larger environmental test facilities are becoming more familiar to researchers and management of the nation's major industries. Indicative of this growth was the first annual technical meeting in Chicago last April of the Institute of Environmental Engineers. This so-called stepchild of the Environmental Equipment Institute which held its conference simultaneously with the IEE, chose New York for its 1958 meeting and embarked on a program that would make other longer established societies sit up and take notice. Attendance at the Chicago meeting reached 500 as compared with 300 in 1956 and 170 in 1955, when the IEE was then known as the Science Section of the Environmental Equipment Institute.

Officers elected were: President, Henry F. Sander, chief test engineer, Vapor Heating Corp.; Executive Vice-President, Roger J. Amorosi, president, Parameters, Inc.; Vice-president, Fiscal Affairs, Harold C. Jones, senior engineer, environmental test section, Air Arm Division, Westinghouse; Vice-president, Membership, Iving P. Polak, section supervisor, MJL Operations, Marquardt Aircraft Co.; Vice-president, Publications, Cyril C. Campbell, senior research engineer, Convair Astronautics; and Vice-president, Local Chapters, Arthur Billet, senior staff engineer, Aero Hydraulics Div. of Vickers, Inc.

Jennings Joins ASHAE As Research Director

THE appointment of Professor Burgess H. Jennings, Evanston, Ill., as Director of Research for the American Society of Heating and Air-Conditioning Engineers is announced by ASHAE President P. B. Gordon, New York, N. Y. The Council of the Society approved this appointment during the ASHAE semi-annual meeting at Murray Bay, P. Q., Canada. Professor Jennings will assume his new responsibilities about the middle of August, directing operations of the Society research program both at the ASHAE Research Laboratory, Cleveland, O., and at cooperating institutions.

Since 1942 Professor Jennings has been chairman of the Department of Mechanical Engineering, The Technological Institute, Northwestern University; an appointment he resigned to become the ASHAE Director of Research. He has been actively engaged in education for over 30 years, serving on the staff of Lehigh University from 1926 to 1940, obtaining the rank of associate professor and serving as Director of the Mechanical Engineering Laboratories. Professor Jennings received his appointment as professor of mechanical engineering at Northwestern University in 1940.

Because of his activity in research work, Professor Jennings has pursued many interests in the fields of thermodynamics, psychrometry, human engineering, fluid flow, gas turbines and compressors, ventilation and air conditioning, and atomic energy. He is the author of some twenty-five research papers and articles and he currently has several additional papers in preparation. The new ASHAE Director of Research has also found time for editorial activities in his field. He prepared the refrigeration section for the well-known Kent Handbook, and was editor-in-chief of the ASRE Data Book 1949 and 1951 editions. He was founder and editor of the magazine Lubrication Engineering from 1944 to 1950.

Past President of the American Society of Refrigerating Engineers, Professor Jennings has served this Society on many committees and in other capacities. A member of the American Society of Heating and Air-Conditioning Engineers since 1942, he has served with the Guide Publication Committee 1947-48 and 1950-51 and chairman in 1952. He has also served on various Technical Advisory Committees, the Research Executive Committee, the Research Long-Range Planning Committee, and as chairman of the Committee on Research. He holds three degrees: Bachelor of Engineering, Johns Hopkins University, 1925; M.S., Lehigh University, 1928; M.A. Lehigh University, 1935.

DR. J. G. WOODROOF, Chairman of the Food Technology Dept. at the Georgia Experiment Station and member of TRRF's Scientific Advisory Council, has been honored by being named one of the University of Georgia's first group of Foundation Professors, a recognition of his unusual scientific ability as researcher and administrator.

APPOINTMENT of Gilbert J. Stecker, NARW past president and AWA general vice-president, to the Agricultural Committee of the U. S. Chamber of Commerce, was announced by the Chamber's president, Phil Talbott, recently.

CHARLES L. PRATT, public relations and sales promotion manager for the National Ice and Cold Storage Company in the Sacramento area, was honored for 50 years of service with the company at a luncheon in the Sutter Club. Millard W. Young of San Francisco, president presented Pratt with a pin encrusted with four diamonds, the first 50-year pin awarded by the company.

A NUMBER of executives of U. S. Cold Storage Corporation have been advanced in position recently. Phillip R. Gates was elected to office of vice-president. Newly elected secretary and assistant treasurer is Mrs. Lee Gambon and William P. Wuehrmann becomes treasurer and assistant secretary. Newly appointed assistant vice-president of engineering is James A. McIlrath. McIlrath is a member of ASRE and NAPRE, serving on the educational instruction staff of the Chicago Chapter, NAPRE.

Anheuser-Busch Brewery

A NEW brewery will be built in Tampa, Fla., by Anheuser-Busch at a cost of 25 million dollars, according to an announcement by The Tampa Chamber of Commerce. This will be Tampa's fourth brewery. The plant, to be completed in two years, will have a capacity of 600,800,000 barrels annually. It will employ from 1,200 to 1,400 workers. The company now has breweries in St. Louis, Newark, N. J., and Los Angeles.

National Ice Convention

THE crowning event of the year for the ice industry will be the annual convention of the National Association of Ice Industries to be held at the Hotel Statler, Detroit, November 12-15, 1957.

The program, it is promised, will be factual and down-to-earth, but with a different approach. The best money-making ideas from the United States and Canada will be poured into the business sessions. There will be outstanding speakers. Members will participate in shirtsleeves workshops or clinics where they will pick up all kinds of ideas of pocketbook value. They will have time for confidential talks with their friends. They will see a fine collection of new money-making equipment and supplies. There will be unusually fine entertainment, including the usual gay dinner-dance and floor show, plus many additional events and some new feature attractions. Big things are being planned for the ladies again this year.

Four Roses Uses Ice Cakes in Advertising

CURRENTLY making its fifteenth annual appearance on the advertising and sales promotion scene is the familiar Four Roses Ice Cake. The campaign this year features two cakes of ice, one containing four red roses and one containing four white roses. The white roses are the trademark of Four Roses gin and the red Roses whisky.

According to Bradley Houghton, Four Roses' advertising manager, the ice cake advertisement has been scheduled for appearance in Life, Look, and New Yorker, and has also been specially adapted as a newspaper advertisement for appearance in major publications across the country. Closely geared to the advertising campaign, a sales promotion program utilizing the ice cake as its major theme is currently under way in package stores and taverns throughout the nation.

Egg Refrigeration Bill Fails in California

THE California Legislature recently considered a bill which provided that, after grading for size and quality, all eggs would be handled under conditions to insure an interior temperature of 60 F or less until delivered to the consumer. The bill failed.

DEATHS

Harry G. Herschman

ONE OF the leaders in the refrigerated warehousing industry, Harry G. Herschman, died in June, after an illness of some time. He was 74. Mr. Herschman was chairman of the board, St. Joseph Terminal Warehouses, Inc. St. Joseph, Mo. He was active in industry and civic affairs and took a special interest in the American Warehousemens Association and The National Association of Refrigerated Warehouses, for each of which he served a term as president. He leaves his widow, a son, Ray, a sister and three grandchildren.

Charles J. Heinzelman

THE Death of Charles J. Heinzelman of Antioch, president of Hubbell Corporation, Mundelein, Ill. occurred Friday, August 2. The Hubbell Corp. manufactures refrigeration control valves. Mr. Heinzelman also was president of Palmyra (Wis.) Basic Foundry. He was a member of the N.A.P.R.E. and the A.S.R.E. Survivors include his widow, Evelyn; a son, John; two grandsons; a granddaughter, and two great grandsons.

GUY ROBERTSON, executive of the United States Cold Storage Co., died at his home in Kansas City, July 5, after an extended illness. For some years he had written a column in "Sno-Man" issued by the company, and knew most of the company personnel.

JOHN CHRISTOPHER KOSTER, Charleston, S. C. treasurer of the Southern Ice Co. died July 24, at his home in Charleston. He was 64. Mr. Koster was also active in music circles and formerly taught music before entering business. He was a 32nd degree Mason, a member of Walhalla Lodge 66.

Swedish Fruit Growers Build Large Storage Plant

THE largest and most modern fruit storage plant in Sweden and one of the biggest in Europe has been built at Kristianstad in South Sweden. It is owned by a cooperative society of 300 apple growers. About 1200 tons of apples can be stored in the new plant at a constant temperature of 38 F. Furthermore, 400 tons can be kept at specially controlled temperatures and atmospheric conditions for longer periods. This is achieved by means of a higher concentration of carbonic acid in the air, whereas the oxygen content is lower than normal. The ripening of the fruit is thereby retarded.

Vegetable Shipments To Honolulu Increase

SHIPMENTS of frozen vegetables from the Mainland to the Honolulu market have increased steadily each year over the past five years. In 1956 the receipts at Honolulu totaled 1.8 million pounds, an increase of 87 percent over 1952.

Among the twenty different types of frozen vegetables shipped to Honolulu annually, frozen peas seem to be the perennial favorite of Honolulu housewives. Shipments of frozen peas in 1956 totaled 401 thousand pounds. Another popular frozen item is snap beans which totaled 226 thousand pounds in 1956—nearly doubling the shipments made in 1952.

Shipments of other frozen commodities were corn, mixed vegetables, broccoli, spinach, and lima beans.

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MANUFACTURERS' NEWS

Vilter Appointments

THE VILTER Manufacturing Company announces the promotion of Francis Pallanch to the position of district manager of the firm's Minneapolis, Minnesota office. Prior to his appointment he served as Vilter sales engineer for Northern Wisconsin and Upper Michigan. In his new post Mr. Pallanch will have the

Francis Pallanch

Howard Eggert

able assistance of Jerome Wensole who served this territory for many years until his recent semi-retirement for reasons of health. Mr. Pallanch joined the company in 1944 after graduating from Marquette University as a mechanical engineer. While at the University he was a member of Pi Tau Sigma, an honorary mechanical engineering fraternity.

Vilter also announces the promotion of Howard Eggert to district sales engineer. In his new post, Mr. Eggert will represent Vilter in Racine and Kenosha Counties, Wisconsin north of Milwaukee, and Upper Michigan. This territory was formerly served by Francis Pallanch. Mr. Eggert graduated from the University of Wisconsin in 1954 with a Bachelor of Science Degree in mechanical engineering. In the same year he joined Vilter's and began the company's training program. After completing the program, he was assigned as an application engineer in the sales department where he served until his present promotion.

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Another Distribution Point For Styrofoam Insulation

OPENING of a warehouse operation in Spokane was announced in June by Wiley-Bayley, Inc., of Seattle, Northwest distributor of Styrofoam, a Dow Chemical Co. plastic foam insulation. Storage facilities are located at Riverside Warehouses, East 41 Gray Street. This is the third warehouse opened in the past 10 months by Wiley-Bayley. The two-year-old organization opened a warehouse in Portland in August, 1956 and an office and warehouse in Vancouver, B. C., in January 1957.

Welles R. Wiley, president of Wiley-Bayley Inc., stated that the new facilities in the Spokane area have been established to keep pace with the growth of the Inland Empire and provide faster service to the steadily increasing number of Styrofoam users. Wiley-Bayley distributes Styrofoam in Oregon, Washington, Idaho, British Columbia and Alaska.

Armstrong Branch Office

THE Insulation Division of the Armstrong Cork Company has established a branch office at Elizabeth, New Jersey, under the New York district Office. A. E. Pearce, general sales manager of the Insulation Division, said the move was made "in order to more adequately serve our trade in the northern New Jersey area and expand our participation in the substantial potential represented by that market." Salesmen assigned to the branch office at Elizabeth were Arthur R. Conaty and Hugh N. March, who have been serving the northern New Jersey area from the New York Office. Also transferred were P. L. Biegler and C. E. Geigel of the New York construction and estimating staff. Mr. Conaty has been appointed Branch Manager. The new branch office is located at 669 Division Street, Elizabeth. Warehouse facilities are also located at the site.

Ernst New Assn. President

T. W. ERNST, manager, coil sales department of The Trane Company, has been named president of the Heating & Cooling Coil Manufacturers Association for 1957-58. Mr. Ernst, a member of the Association for four years, said, "Our over-all objective during the coming year will be to secure industry-wide recognition of the testing and coil rating code developed by H.C.C.M.A." The new president of the Coil Manufacturers group, numbering sixteen firms in its membership, is a graduate of the training program. He received his mechanical engineering degree from Marquette University, Milwaukee.

Relief and Safety Vents Should be Safely Piped

SAFE venting arrangements for relief of safety valves is often overlooked, according to E. Grafe, field engineer, Spence Engineering Co. Inc., Walden, New York. Writing on the topic of how safety lowers maintenance costs in regulating stations, Grafe made a specific point describing the elaborate means built into machinery equipment and systems in order to provide safety to operators and prevent damage to property, all of which can be undone through the improper venting of a single valve.

In an apartment house a relief valve was vented directly into the equipment room. It opened and before the system could be secured the escaping vapor had blown a considerable amount of insulation off the equipment room ceiling. Most of the electrical gear located in the same place was saturated.

Fortunately no personnel were in the equipment room at the time, although the nature of the vapor was neither toxic nor hazardous to humans in a well ventilated area. Omission of the few feet of pipe required to carry the relief valve discharge to an out-of-doors area where it could be safely vented, in this case was no economy.

Price List on Cold Plates

A NEW price list IBC-57 covering their Dean ice bank cooling plates has been issued by Dean Products, Inc., 1042 Dean Street, Brooklyn 38, N. Y. Zinc-metalized with .003 to .004 thick coating, these plates are double embossed. Fittings are 5/8 in. tubing. These plates are particularly valuable for industrial use where large quantities of chilled water are required. Ice banks utilize the latent heat of ice to store refrigeration available in slack periods to be used during peak requirements. Both standard and special sizes are available. A recent installation used 46 Cold Plates 60 x 120 inches in a single vat.

CATALOGS AND BULLETINS

Link Belt Publishes Booklet On Icing Foods

MODERN methods of icing perishable commodities in transit and storage are described in a 24 page booklet on icing equipment, Book No. 2382, published by Link-Belt Company. Types of equipment for both bunker icing and top-icing are presented, ranging from self-propelled car icers for railroad icing docks to ice crushers and slingers used by produce growers, poultrymen, fishermen, dairymen, railroads, truckers, shippers and re-icing stations. Link-Belt ice crusher slingers direct crushed snow-ice over and between tiers of containers, completely blanketing produce for protection. Spoilage is reduced to a minimum and flavor freshness is preserved.

Temperatures produced by top-icing are close to ideal for leafy vegetables, according to the U. S. Department of Agriculture, and the moisture produced by the slowly melting ice prevents dryness and wilting of the leafy foods. For initial icing or re-icing of bunkers of railroad cars the booklet gives full information, including schematic drawings on dock-type and rail-type car icers. Seven models of ice crusher slingers, with capacities from 15 to 60 tons per hour, are described, together with ice crushers, portable ice slingers and ice pulverizers.

Bulletins on Cooling Towers and Condensers

THE Baltimore Aircoil Company has published a 12-page bulletin featuring their latest line of "TM" Blow-Through and "TU" Draw-Through Cooling Towers. This bulletin covers the complete line of factory-assembled centrifugal fan cooling towers, 19 sizes, from 10 to 400 tons. The construction, components and finish of the units are described, utilizing illustrative photographs.

The company has also published a 12-page bulletin featuring their latest line of "CM" Blow-Through and "CU" Draw-Through Evaporative Condensers. This bulletin covers the complete line of centrifugal fan units, 18 sizes, from 10 to 350 tons, for Freon 12, Freon 22 and Ammonia. The construction, components and finish of the units are described in detail, utilizing illustrative photographs. Very complete selection data, plus detailed dimensional drawings, is included.

Conversion Factors Chart

A REFERENCE table for engineers and other executives in wall chart form has been published by Precision Equipment Co., Chicago 1, Ill. This conversion chart is useful for engineers, shop men and other executives. Included are common conversions such as inches to centimeters or watts to hp. as well as many conversions that are difficult to locate in reference manuals. (Some such examples are atmospheres to Kgs/sq. cm, cm/sec to miles/hr, cu. ft. to liters, microns to meters, quintal to lbs., etc., etc.)

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: 20c per word; minimum 25 words. $2.00 per line for bold face headings: $15.00 per inch for line listings.

Positions and Help Wanted

WANTED — OPERATING ENGINEER Permanent year around position, 8 hour shift, in 350 ton all electric full row pull at large icing station. Company paid hospitalization including family, life insurance, vacation with pay. An excellent opportunity for a capable man. Write P.O. Box 669, Mutual Ice Co., Alexandria, Va.

Ice Plants For Sale

FOR SALE — Modern 90 ton ice plant complete with masonry building, or separately. Bargain. 51 N. 2nd St., Stroudsburg, Pa.

USED EQUIPMENT—wanted & for sale

FOR SALE — 5x5 Yorks and Fricks. 8x8 York. 15 ton shell & tube condenser. 20" receiver. Valves, all sizes. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

PERFORMANCE PROVED — New Ball Valve increases the performance of any compressor — old or new. See the Ball Valve ad on page 10 of this issue.

FOR SALE — Refrigeration equipment; ice equipment; new, used. Advise us your needs. Use "QUICKSEAL" — stops brine tank leaks; easy, efficient, economical. Born Company, 56 East Jackson Boulevard, Chicago 4, Illinois. WAbash 2-2290

FOR SALE
10x10 & 9x9 York ammonia compressors.
10x7½ & 8x6 York Model D-8 boosters.
7½x7½ York w/V-belt drive to 50 h.p. motor.
4x4 York self-conta.ned unit.
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10 h.p. Fuller rotary air compressor.
300 h.p. Westinghouse starter 4160 volts (New).
Condensers, receivers, motors, etc.
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A & Venango Sts. Philadelphia 34, Pa.
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WANTED — Hydraulic lift truck for bunker icing of railroad cars. 3 to 7 ton capacity. Scottsbluff Ice & Storage Co., P.O. Box 348, Scottsbluff, Nebr.

WANTED TO BUY — 60-75 ton shell and tube brine cooler; must be reasonably priced and in good condition. Frank Wilcox, 918 Berdan Ave., Toledo 12, Ohio. Phone KI 3574.

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2—9"x9" 2-cyl. York D.C. to 75 h.p. motor.
1—7¾"x5" Frick booster.
2—7½"x7½" 2-cyl. York compressors.
1—6"x6" Frick 2-cyl. compressor.
1—5"x5" York 2-cyl. compressor.
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11"x22"x47" — 11"x22"x51" ice cans.
20—100-ton ice plants, York and Frick.
1—8¾"x8" 8-cyl. V/W York belt driven ammonia compressor.
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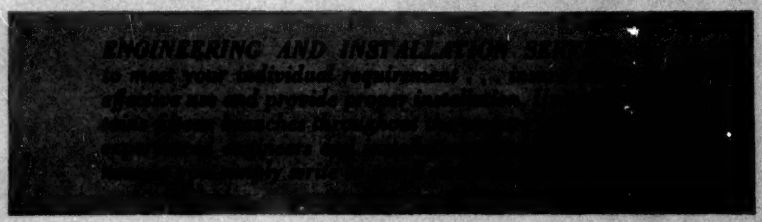

ADVERTISERS

Allied Chemical & Dye Corp., Nitrogen Div. 12
Allin Mfg. Co. 47
Armour & Co. 23
Armstrong Cork Co. 9

Ball Valve Co. 10
Baroda and Page, Inc. 6
Brown Mfg. Co., Inc., K. G. 43
Butcher Boy Refrigeration Door Co. 1

Carrier Corp. 33
Chemical Solvent Co. 44
Chicago Nipple Mfg. Co. 54
Classified Advertising 55

Detroit Ice Machine Co. 40
Dow Chemical Co., The .....4 and 5

Frick Co. 53

General Chemical Div., Allied Chemical & Dye Corp. .....Inside Back Cover
Gifford-Wood Co. 39
Greene, Van R. H. 54

Howe Ice Machine Co. 8

Jamison Cold Storage Door Co. .....Back Cover

King Co. of Owatonna, The 43
Kramer Trenton Co. 2

National Pipe Bending Co. 37
Nickerson & Collins Co. 53

Ohio Galvanizing Co. 51

Patterson & Assoc. Inc., V. C. 54
Perfection Ice Scoring Machine Co., The .. 51
Pittsburgh Corning Corp. .....27 and 29

Refrigeration Engineering Co. 47

Swift & Co., Adhesive Products Dept. 41

Taylor Instrument Companies 7
Texas Co., The .....Inside Front Cover

United Cork Companies 56

Wanted and For Sale Advertising 55

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genetron 113—PURPLE LABEL TRICHLOROTRIFLUOROETHANE	Used in 50-ton and larger centrifugal compressors, primarily for large comfort cooling systems, brine cooling systems, and other commercial and industrial air conditioning and refrigeration systems.
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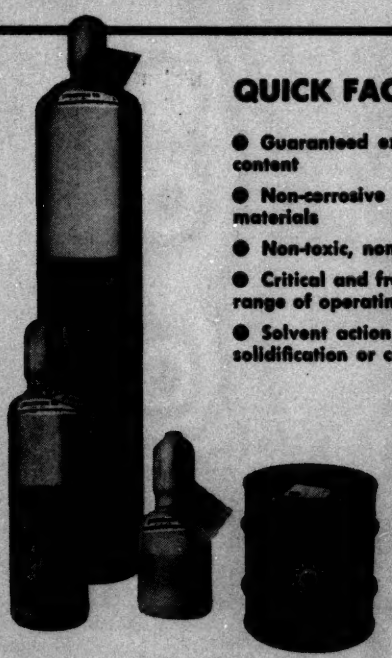

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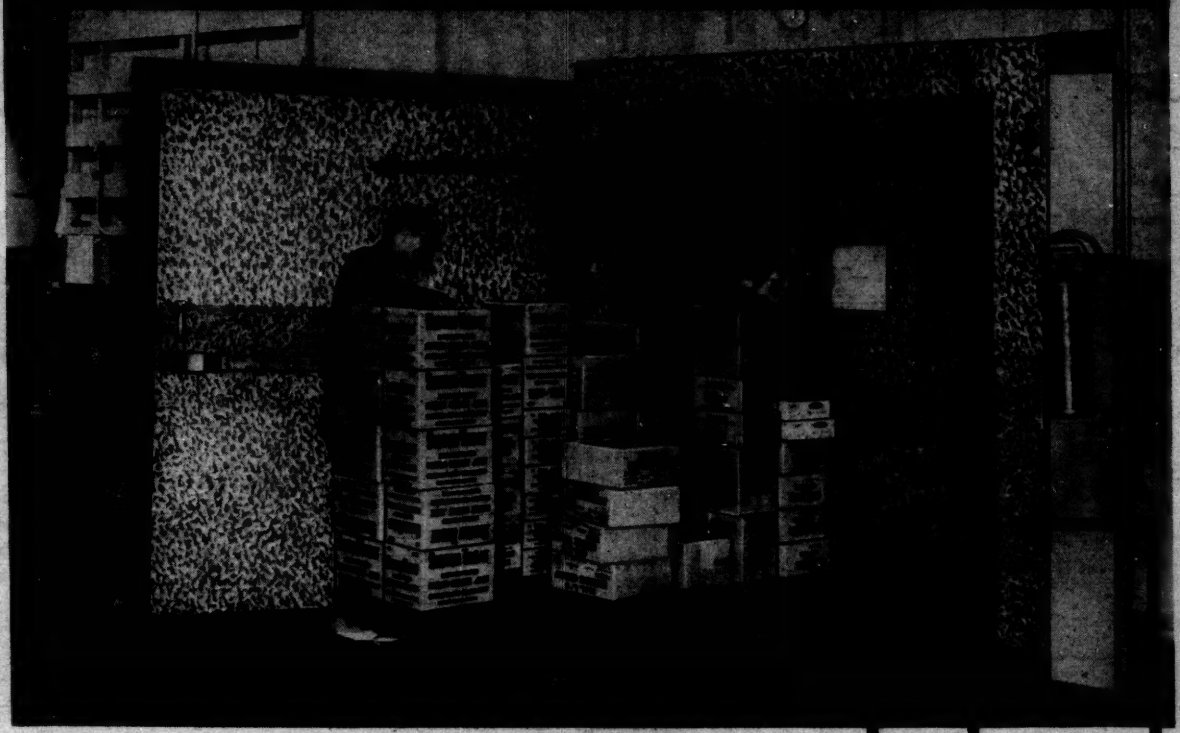

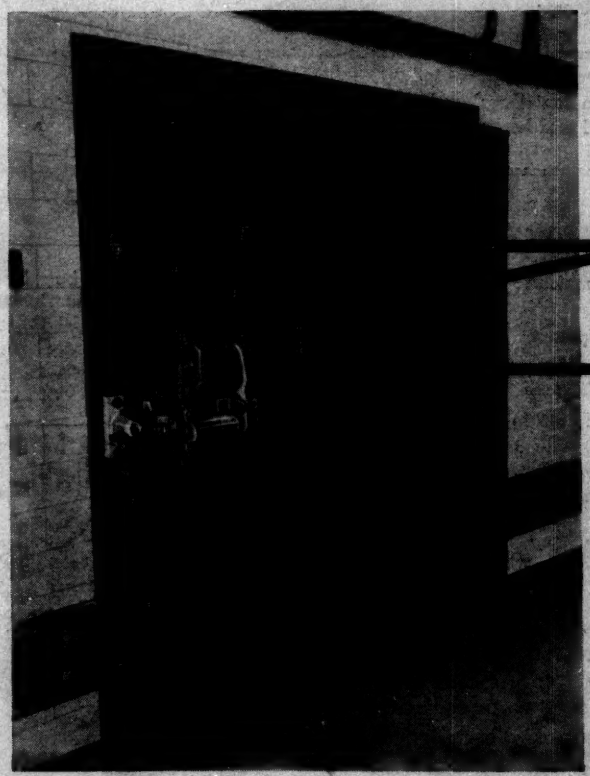

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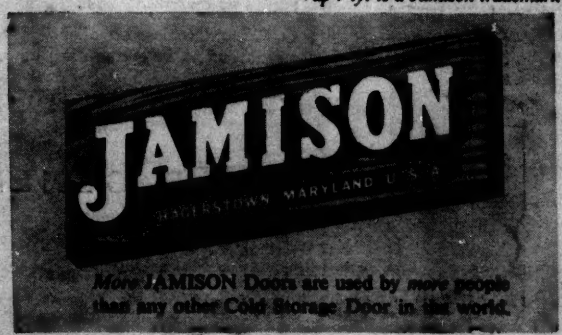

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